

White, Terrena

From: Grant, Carole
Sent: May-23-18 10:52 AM
To: Bradbury, Ian R; Dempson, Brian
Subject: RE: Grieg Environmental Assessment update

It appears the Environmental Assessment Committee which I sit on is planning to meet during the week of June 18 to discuss the EIS, so might be beneficial if we all had a chance to at least have a preliminary review of the EIS document prior to this. Why don't we plan to meet on Thurs, June 14. Does that work for you guys?

From: Grant, Carole
Sent: May-22-18 2:43 PM
To: Bradbury, Ian R; Dempson, Brian
Subject: FW: Grieg Environmental Assessment update

The final EIS is posted on the Provincial website and can be accessed at the link below.

Please review and provide any comments back to me at your earliest convenience, but definitely before the end of June. Might be worth the 3 of us getting together once we've all had a chance to review.

Thanks
Carole

From: Hendry, Christopher
Sent: May-22-18 2:35 PM
To: Grant, Carole; Hamoutene, Dounia; Abbott, Melissa H; Norman, Leslie; Keats, Kimberley F; Mercer, Dawn
Subject: Grieg Environmental Assessment update

Hi, everyone.

Grieg has submitted their Environmental Impact Statement to the provincial Minister of Municipal Affairs and Environment. (see http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html).

In accordance with the Guidelines for Environmental Assessment Committees, within 45 days of receiving the EIS and Component Studies, referral agencies must provide the Province with completed review forms including a written opinion as to whether the EIS is satisfactory, or unsatisfactory. 45 days later will be **July 7, 2018**. There will also be an additional public comment period, whereby public comments on the EIS will be due by July 12, 2018. The EAC will provide a written EIS recommendation to the Minister asap after the public comments have been considered and the minister's decision as to the acceptability of the EIS will be given to the proponent by **August 1, 2018**.

In preparation for this review, I will be teasing out the various sections of the EIS for your respective review and will follow up regarding individual or group discussions on content.

Additionally, I will be planning a joint collaborative meeting with your respective RDs and the RDG to review the proposal and review process.

Stay tuned!

Chris

Christopher Hendry, B.Sc. (Hons.), M.Sc.

Acting Director of Aquaculture Management, Ecosystems Management Branch
Fisheries and Oceans Canada, Government of Canada
christopher.hendry@dfo-mpo.gc.ca / Tel: 709-772-6674

Directeur intérimaire, Gestion de l'aquaculture, Direction de la gestion des écosystèmes
Pêches et Océans Canada, Gouvernement du Canada
christopher.hendry@dfo-mpo.gc.ca / Tél.: 709-772-6674

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Kelly, Jason

From: Kelly, Jason
Sent: May-28-18 11:23 AM
To: Finn, Ray
Subject: RE: Grieg Environmental Assessment

yes, also including as an updated on RDG/ADM bilat this week (i.e. EA in, proceeding with review etc...)

From: Finn, Ray
Sent: May-28-18 11:19 AM
To: Kelly, Jason
Cc: Pike, Kelly J
Subject: RE: Grieg Environmental Assessment

As discussed I fully agree – please proceed as we would normally

Ray

Ps – I will raise at next RMC roundtable

Also please consider including on next weekly AES report

From: Kelly, Jason
Sent: Monday, May 28, 2018 11:11 AM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Subject: RE: Grieg Environmental Assessment

Ray,

Perhaps this is something you can raise around RMC or ROC.

I suggest that we (Roger) should just proceed with reaching out to our sector contacts given the short timelines on the review. I would think all implicated sectors already have an appreciation on the file. We can work with them directly to ensure a thorough and timely review.

Ok for us to proceed this way????

Jason

From: Finn, Ray
Sent: May-25-18 3:24 PM
To: Kelly, Jason
Cc: Pike, Kelly J
Subject: FW: Grieg Environmental Assessment

We can and should revisit this – I doubt Chris got any uptake to be honest

Ray

From: Hendry, Christopher

Sent: Tuesday, May 22, 2018 2:44 PM

To: Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>; McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>; Smyth, Joanne <Joanne.Smyth@dfo-mpo.gc.ca>; Lambert, Robert <Robert.Lambert@dfo-mpo.gc.ca>

Cc: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>

Subject: Grieg Environmental Assessment

Hi, Regional Directors and Regional Director General,

Grieg has submitted their Environmental Impact Statement to the provincial Minister of Municipal Affairs and Environment. (see http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html).

In accordance with the Guidelines for Environmental Assessment Committees, within 45 days of receiving the EIS and Component Studies, referral agencies must provide the Province with completed review forms including a written opinion as to whether the EIS is satisfactory, or unsatisfactory. 45 days later will be **July 7, 2018**. There will also be an additional public comment period, whereby public comments on the EIS will be due by July 12, 2018. The EAC will provide a written EIS recommendation to the Minister asap after the public comments have been considered and the minister's decision as to the acceptability of the EIS will be given to the proponent by **August 1, 2018**.

In preparation for this review, and sensitive nature of the EA, I would like to engage you all in the coming week(s) to summarize the EIS and review process in light of any implications the review may overlap with your respective mandates. This can be a good opportunity to answer any questions you may have. I will work with your EAs to identify a mutually beneficial time. Best regards.

Chris

Christopher Hendry, B.Sc. (Hons.), M.Sc.

Acting Director of Aquaculture Management, Ecosystems Management Branch
Fisheries and Oceans Canada, Government of Canada
christopher.hendry@dfo-mpo.gc.ca / Tel: 709-772-6674

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Pêches et Océans Canada, Gouvernement du Canada
christopher.hendry@dfo-mpo.gc.ca / Tél.: 709-772-6674

Kelly, Jason

From: Kelly, Jason
Sent: May-28-18 2:11 PM
To: Pike, Kelly J
Cc: Finn, Ray
Subject: RE: Bi-Weekly bilat Jackie / Philippe set for May 29th in Philippe's office

Kelly, May 28 update on Grieg
Jason

Update May 28, 2018: Grieg NL Environmental Assessment

- On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment. This action has initiated the start of a 45 day public review process and a review by expert departments and agencies including DFO.
- DFO have initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. DFO will also identify measures to mitigate any adverse effects.
- DFO will provide comments to the Environmental Assessment Committee, by July 7, 2018, who will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal Affairs and Environment. The minister will ultimately determine the acceptability of the EIS and notify the proponent by August 1, 2018.
- Court appeal ruling is outstanding. If appeal in Grieg favor, EIS work will likely stop

From: Pike, Kelly J
Sent: May-28-18 11:03 AM
To: Bieger, Tilman; Kelly, Jason; Hendry, Christopher; Van Ingen, Richard; Sullivan, Katrina
Cc: Griffiths, Helen; Tulk, Kirby; Finn, Ray
Subject: FW: Bi-Weekly bilat Jackie / Philippe set for May 29th in Philippe's office
Importance: High

Please advise if you have any item(s) you wish for RDG to include in their Bilat with ADM.

Please provide your input and/or Nil response to me before **2:00 pm today**.

For your reference, I have attached input from last Bilat on May 4.

Kelly

From: Butler, Annette
Sent: Monday, May 28, 2018 10:03 AM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>

Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>

Subject: FW: Bi-Weekly bilat Jackie / Philippe set for May 29th in Philippe's office

Hi Ray,

Do you have anything for Jackie's bilat with Philippe?

Thanks,

Annette

From: Perry, Jacqueline

Sent: 2018-May-28 9:52 AM

To: Butler, Annette

Subject: Re: Bi-Weekly bilat Jackie / Philippe set for May 29th in Philippe's office

Yes that's the plan unless Ray has something to suggest. Please check with him.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butler, Annette

Sent: Monday, May 28, 2018 8:11 AM

To: Perry, Jacqueline

Subject: FW: Bi-Weekly bilat Jackie / Philippe set for May 29th in Philippe's office

Will you meet with Phillipe @ 200 Kent tomorrow morning @ 10:30 EST? And if so – can I confirm with Sylvie that the bilat will be verbal only?

Thanks,

Annette

From: Genier, Sylvie

Sent: 2018-May-28 9:26 AM

To: Butler, Annette; Neary, Lynn

Subject: Bi-Weekly bilat Jackie / Philippe set for May 29th in Philippe's office

Importance: High

Hi Lynn / Annette,

Does Jackie have items for her bilat tomorrow or verbal only?

Thanks

Sylvie Genier

Scheduling Coordinator / Coordinatrice de l'agenda

Assistant Deputy Minister / Bureau du sous-ministre adjoint

Aquatic Ecosystems Sector / Secteur des écosystèmes aquatiques

613-993-2734

Meade, James

From: Meade, James
Sent: May-28-18 3:50 PM
To: Johnson, Roger
Subject: RE: Grieg CSAS
Attachments: Request for Science Advice_FP_5097_E.pdf

And here's the Request to fill out to get the process added to the Schedule.

Cheers,
Jim

From: Johnson, Roger
Sent: May-28-18 1:56 PM
To: Meade, James
Subject: FW: Grieg CSAS

Any thoughts

From: Kelly, Jason
Sent: Monday, May 28, 2018 1:32 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: FW: Grieg CSAS

Se below, I also think we should talk to jim meade and see if we should be going through the csas office for science as per normal protocol.

Thanks Roger
Jason

From: Hendry, Christopher
Sent: May-28-18 11:27 AM
To: Kelly, Jason
Subject: Re: Grieg CSAS

I have been dealing with Carole and Dounia Hamoutene from Science. Other sectors include Leslie Norman (policy), Melissa Abbott (resource management), Shawna (oceans).

From: Kelly, Jason
Sent: Monday, May 28, 2018 09:47
To: Hendry, Christopher
Subject: RE: Grieg CSAS

Ok, generally, there was a time we could go right to the scientist themselves however they like having this on the schedule, and csas manages the official response to us. My group will work with CSAS to get in in the system.

Can you give me a list of people you have been working with in other sectors and we will try to keep it consistent

jason

From: Hendry, Christopher
Sent: May-28-18 11:12 AM
To: Kelly, Jason
Subject: Re: Grieg CSAS

No. A CSAS was already conducted on the proposed project via the Introductions and Transfers process. There has been no discussion on repeating that.

From: Kelly, Jason
Sent: Monday, May 28, 2018 09:36
To: Hendry, Christopher
Subject: Grieg CSAS

Did you have Grieg on the CSAS schedule???

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REQUEST FOR PEER REVIEWED SCIENCE INFORMATION AND/OR ADVICE

Title of Request	ID# (for internal use only)
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Branch Contact

Name	Title
Telephone Number	Email
Region	Sector
Directorate	Branch

Request Details

Issue requiring science information and/or advice (i.e., "the question" or "the need"). Posed as a question to be answered by Science.
Rationale or context for the request: What will the information/advice be used for? Who will be the end user(s)? Will it impact other DFO programs or regions?

Additional Information (please be as concise as possible)

What is the expected course of action if science advice is not provided? Could this negatively affect species, habitat(s) or ecosystem(s) of concern?	
Will this request help DFO move towards an ecosystem approach to management? For example, does this request relate to overarching national objectives of conserving biodiversity, productivity or habitat, or more specific bioregional ecosystem objectives (if they exist)? Are there specific ecosystem considerations that should be taken into account?	
<input type="radio"/> Yes <input checked="" type="radio"/> No	If yes, please elaborate.



Is the provision of this information/advice required to meet a legal or regulatory requirement?	
<input type="radio"/> Yes <input checked="" type="radio"/> No	If yes, please elaborate.
Does this issue have public, media and/or government (outside DFO) interest or involvement at the local, regional, national or international level?	
<input type="radio"/> Yes <input checked="" type="radio"/> No	If yes, please elaborate.
Is the provision of this information/advice required to support a departmental priority?	
<input type="radio"/> Yes <input checked="" type="radio"/> No	If yes, describe which priority and provide a short rationale.
Is the provision of this information/advice required to respond to or meet an international commitment?	
<input type="radio"/> Yes <input checked="" type="radio"/> No	If yes, which commitment?

Administrative Details

Deadline

Latest Possible Date to Receive Science Advice
Rationale

Funding

Do you have funds to cover any extra costs associated with this request (i.e.: special analysis, meeting costs, translation)?	
<input type="radio"/> Yes <input checked="" type="radio"/> No	If yes, please elaborate.

Branch Approval

Approval Date	Name of Director (or Delegated Authority)	Submission Date
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Approved request forms are to be submitted to the CSA/CSAS Coordinator in your region.

Ecosystems Management Briefing Bullets for RDG Bilat with ADM
May 29, 2018

Regional Marine Conservation Targets for 2020 (update):

- Work ongoing in region and at NHQ with Nunatsiavut Government on an Area of Interest for a MPA in the NG marine zone.
- Work ongoing in region with Fish Food & Allied Workers union on Area of Interest for an additional MPA offshore of east coast of Newfoundland.

Upcoming meeting of Regional Oversight Committee on Oceans Management (ROCOM):

- Committee is co-chaired by RDG and provincial DM of Fisheries Lands & Resources.
- Planning ongoing for meeting June 11
- Department plans to share information on regional plans for MCT 2020 (including on advancing networks in Gulf of St. Lawrence and NL Shelves), as well as on regional Marine Spatial Planning initiative (desire to re-focus from Placentia Bay to offshore areas)

Upcoming meeting of board of One Ocean:

- One Ocean is an organization in NL with members from fishing and oil & gas organizations created to share information on issues of mutual interest. The RDG-DFO, the AC-CCG, and the chair of the C-NLOPB participate as observers.
- One Ocean requested information at the next board meeting (June 8) on marine protected areas, refuges, and the activities allowed or restricted in them, as well as on the national Advisory Panel on MPA standards.
- Regional personnel are preparing to speak to facts at the meeting, and will engage with NHQ as part of that.
- It is possible some industry representatives at the meeting could express criticism of the approach taken by DFO in implementing recent marine conservation measures.

Update: Grieg NL Environmental Assessment

- On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment. This action has initiated the start of a 45 day public review process and a review by expert departments and agencies including DFO.
- DFO have initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. DFO will also identify measures to mitigate any adverse effects.
- DFO will provide comments to the Environmental Assessment Committee, by July 7, 2018, who will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal

Affairs and Environment. The minister will ultimately determine the acceptability of the EIS and notify the proponent by August 1, 2018.

- Court appeal ruling is outstanding. If appeal in Grieg favor, EIS work will likely stop

FPP National Engagement Session:

- On June 7th, an engagement session will take place with regional FPP staff to facilitate discussion on the proposed amendments to the Fisheries Act and how these changes will affect the revitalized Fisheries Protection Program.
- This session follows the inaugural session which took place in March 2018

No information has been removed or severed from this page

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: May-29-18 3:07 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Squires, Susan
Subject: Itinerary for Site Visit, Marystown Hatchery and Rushoon BMA

Good Afternoon,

The majority of EAC members selected Scenario 1, June 12-13 for the site visit, so we'll go with that. I'm suggesting the following itinerary:

Tuesday, June 12, 2018

- Arrive in Marystown by 12 noon, check-in at Braxton Suites (suggested)
- Meet for lunch 12:30 (TBD)
- Meet at Grieg NL Office in Marystown at 1:30, travel to hatchery site and landing sites
- Return to Braxton Suites (or alternate location) 3:30ish for presentation by expert panel (DNV GL) re Aqualine Midgard Sea-Cage Study
- Free for supper
- Informal meeting to discuss EIS review at 7:00 (tentative-suggestion)

Wednesday, June 13, 2018

- Meet at Grieg NL office at 9:00am, drive to Petite Forte (check out of hotel)
- Boat trip to Rushoon BMA (life jackets will be provided, but bring your own if you prefer)
- Return home

Please confirm your attendance (below) on June 12 and 13, so I can give Perry the final head count for the boat.

Site Visit- June 12-13, 2018	Will Attend	Will Not Attend
Joanne	X	
Dorothea		
Vicki		
John		X
Chris		
Carole		
Jonathan		
Blair		
Daryl		
Melissa		
Allison		X
Jerry		X

Joanne
709.729.2822

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Kelly, Jason

From: Kelly, Jason
Sent: May-30-18 1:25 PM
To: Johnson, Roger
Subject: FW: Update May 28, 2018: Grieg NL Environmental Assessment

See below

From: Hendry, Christopher
Sent: May-29-18 9:39 AM
To: Kelly, Jason
Subject: Re: Update May 28, 2018: Grieg NL Environmental Assessment

Will do. Most recent update is what I sent to Ottawa last week copying all managers.

On May 29, 2018, at 07:41, Kelly, Jason <Jason.Kelly@dfo-mpo.gc.ca> wrote:

Thanks Chris, I took dates etc... from previous note sent to RDs. I'll run through you next time. Let me know if you receive any correspondence from the EAC chair that may impacts timelines or the review process

Thanks
Jason

From: Finn, Ray
Sent: May-28-18 5:09 PM
To: Hendry, Christopher
Cc: LaRue, Jean-François; Kelly, Jason
Subject: RE: Update May 28, 2018: Grieg NL Environmental Assessment

Thks for the value added Chris

Ray

From: Hendry, Christopher
Sent: Monday, May 28, 2018 4:54 PM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Cc: LaRue, Jean-François <Jean-Francois.LaRue@dfo-mpo.gc.ca>; Kelly, Jason <Jason.Kelly@dfo-mpo.gc.ca>
Subject: Re: Update May 28, 2018: Grieg NL Environmental Assessment

Some minor corrections, mainly dates. Additionally, because this is an EIS, provincial Cabinet makes the ultimate determination and communicates such to the proponent.

- Grieg submitted their Environmental Impact Statement (EIS) to the Province on May 22, 2018
- In accordance with the provincial Guidelines for Environmental Assessment Committees (EACs), committee members must provide a completed review including a written opinion as to whether the EIS is satisfactory, or unsatisfactory, by July 13, 2018.
- The EIS is also posted online for a 50-day public commentary period, with a deadline of July 11, 2018.

- The provincial minister of Municipal Affairs and Environment's decision on the acceptability of the EIS is due on July 31, 2018.
- The minister's recommendation to provincial Cabinet is due by August 30, 2018, and Cabinet will inform the proponent of its decision, for which there is no deadline.

On May 28, 2018, at 12:54, Finn, Ray <Ray.Finn@dfo-mpo.gc.ca> wrote:

Salut JF

Below is a short summary on Greig – we have included for Jackie's consideration with her bilat tomorrow with the ADM

The EIS review is being coordinated by FPP – Jason Kelly – Lead

Update May 28, 2018: Grieg NL Environmental Assessment

- On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment. This action has initiated the start of a 45 day public review process and a review by expert departments and agencies including DFO.
- DFO have initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. DFO will also identify measures to mitigate any adverse effects.
- DFO will provide comments to the Environmental Assessment Committee, by July 7, 2018, who will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal Affairs and Environment. The minister will ultimately determine the acceptability of the EIS and notify the proponent by August 1, 2018.
- Court appeal ruling is outstanding. If appeal in Grieg favor, EIS work will likely stop

Ray Finn
Regional Director / Directeur régional
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada / Pêches et Océans Canada
PO Box 5667 / CP 5667
St. John's NL A1C 5X1 / St. John's T. N.-L. A1C 5X1
Tel | Tél : (709) 772 2442
Fax / Télé: (709) 772 7862

Meade, James

From: Meade, James
Sent: May-30-18 2:00 PM
To: Johnson, Roger
Cc: Pilgrim, Bret
Subject: RE: Request for advice Grieg Aquaculture

Please send me the link to the EIS.

The one you attached keeps bringing me back to same page – Project page with no link to EIS.

Thanks and Cheers,
Jim

From: Johnson, Roger
Sent: May-30-18 1:33 PM
To: Meade, James
Cc: Pilgrim, Bret
Subject: Request for advice Grieg Aquaculture

Please see attached documents; one is the request form the other is the list of appropriate sections. If you or staff in your branch would like to comment on other sections please feel free to do so.

This is the informal submission to allow the start of this process while the official request is going for signature hopefully today.

If there are any questions now or during this process please feel free to direct them to me anytime. I will be discussing this with Carol the next time I see her.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Pilgrim, Bret
Sent: Wednesday, May 30, 2018 3:42 PM
To: Kelly, Jason
Cc: Johnson, Roger
Subject: Memo - Placentia Bay Atlantic Salmon Aquaculture Project
Attachments: Memo R Finn.docx; Request for Science Advice Grieg.pdf; Request to Science.docx

Jason,
Please see the attached for review.

Let us (Roger...) know if there are any questions

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562



**PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT – GRIEG NL
SEAFARMS LTD.**
(FOR INFORMATION / FOR SIGNATURE)

SUMMARY

The purpose of this note is to formally request a CSAS review, and subsequently, advice on the Environmental Impact Statement for the Placentia Bay Atlantic Salmon Aquaculture Project submitted to the Newfoundland & Labrador Government by Greig NL Seafarms Ltd. and Greig NL Seafarms Ltd. to develop a Departmental response to the NL Government

Please endeavour to complete the review and provide a response by June 27, 2018.

BACKGROUND

- The Placentia Bay Atlantic Salmon Aquaculture Project is proposed by Greig NL Nurseries Ltd. and Greig NL Seafarms Ltd.
- The proposed project is to build and operate a hatchery for Atlantic salmon and to build and operate sea farms in Placentia Bay.
- Eleven sea cage sites will be located throughout Placentia Bay. At peak production, there will be seven active sea cage sites with 78 sea cages in operation per year. Peak production is expected to be seven million salmon per year.

STRATEGIC CONSIDERATIONS

The Placentia Bay Atlantic Salmon Aquaculture Project has undergone public scrutiny as the project was originally released from having to carry out further environmental assessment by the NL Government in 2016. The Atlantic Salmon Federation challenged the decision in 2016 and in 2017 the provincial Supreme Court ruled it was not reasonable to release the project and ordered an Environmental Impact Statement.

As the outcome of the EIS will be closely monitored by stakeholders and the general public, it is important that DFO review and provide expert response/advice.

ADVICE AND RECOMMENDATIONS

It is recommended that Science Branch carry out a peer review of the EIS in order for the Department to provide a scientific robust response to the NL Government.

Ray Finn
RD, Ecosystems Management

Attachment(s): (2)

- 1) Request for Peer Reviewed Science Information and/or Advice form.
- 2) Document outlining specific sections of the EIS requiring review by DFO Science.

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CLASSIFICATION
GCCMS #: 20##-###-#####
EKME #: #####

To: Catherine Blewett
Pour:

Date:

Object: TITLE
Objet: TITRE

From / Name of DG, Title
De:

Via: Name of S/ADM, Title

Additional approvals:
Autre(s) approbation(s):

☐

Material for the Minister
Documents pour le Ministre

☐

Your Signature
Votre signature

☐

Information

Screen: The Department has assessed this issue in full.
Filtre: ☐ It contains no reference to matters covered by the screen relating to J.D. Irving Limited.
☐ It contains matters referenced in the screen relating to J.D. Irving Limited, but in our view does not engage the screen.
☐ In our view, the screen relating to J.D. Irving Limited should be engaged.

Remarks: This briefing note was developed in consultation with the following
Remarques: regions/sectors: [please list who was consulted internally]

Distribution: *Please indicate name of people to receive a copy and if prior or following the DM approval. (Remove if no Distribution is required)*

Drafting Officer/
Rédacteur:

NAME (TEL #)/ Director / admin initials



REQUEST FOR PEER REVIEWED SCIENCE INFORMATION AND/OR ADVICE

Title of Request Review appropriate section of the Environmental Impact Statement of Placentia Bay Atlantic Salmon Aquaculture Project	ID# (for internal use only)
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Branch Contact

Name Roger Johnson	Title Senior Fisheries Protection Biologist
Telephone Number (709) 772-3296	Email Roger.Johnson@dfo-mpo.gc.ca
Region NL	Sector Ecosystems and Fisheries Management
Directorate Fisheries Protection - Regulatory Reviews	Branch Ecosystem Management

Request Details

Issue requiring science information and/or advice (i.e., "the question" or "the need"). Posed as a question to be answered by Science. Grieg NL is proposing the Placentia Bay Atlantic Salmon Aquaculture Project consisting of a land based hatchery and 11 sea cage sites in the northern portion of Placentia Bay. The proponent has submitted an EIS to the province of NL. DFO has representatives on the provincial EA committee. It is requested that Science Branch review the appropriate sections of the EIS (see attached list). This review will allow DFO to fully respond to the request for comments on the EIS.

Rationale or context for the request: What will the information/advice be used for? Who will be the end user(s)? Will it impact other DFO programs or regions?

The advice received will be part of a thorough scientific and technical review of the EIS and will allow provision of appropriate comments to the Province of NL on the assessment of impacts and mitigations to fish, fish habitat, species at risk, special marine areas and commercial fisheries. The end user of the input from Science will be the Province of NL EA Assessment Committee.

Additional Information (please be as concise as possible)

What is the expected course of action if science advice is not provided? Could this negatively affect species, habitat(s) or ecosystem(s) of concern?

If Science advice is required and not provided, the advice from DFO to the Province of NL may lack appropriate level of scientific rigor.

Will this request help DFO move towards an ecosystem approach to management? For example, does this request relate to overarching national objectives of conserving biodiversity, productivity or habitat, or more specific bioregional ecosystem objectives (if they exist)? Are there specific ecosystem considerations that should be taken into account?

☐ Yes ☒ No

If yes, please elaborate.



Is the provision of this information/advice required to meet a legal or regulatory requirement?

☐ Yes

If yes, please elaborate.

☒ No

Does this issue have public, media and/or government (outside DFO) interest or involvement at the local, regional, national or international level?

☒ Yes

If yes, please elaborate.

☐ No

Other federal and provincial government agencies - e.g. Environment and Climate Change Canada, Transport Canada, NL Department of Municipal Affairs and Environment, NL Department of Fisheries and Land Resources - will be involved in the review of the project EA. This project has garnered (and continues to do so) a significant amount of media attention and has been subject to a court challenge - that court ruling is now under appeal.

Is the provision of this information/advice required to support a departmental priority?

☒ Yes

If yes, describe which priority and provide a short rationale.

☐ No

Supports departmental priorities related to sustainable development and review of major natural resource development projects.

Is the provision of this information/advice required to respond to or meet an international commitment?

☐ Yes

If yes, which commitment?

☒ No

Administrative Details

Deadline

Latest Possible Date to Receive Science Advice

June 27, 2018

Rationale

The comment period for the EIS closes July 11 and DFO-FPP will need time to collate comments from Science and other sectors.

Funding

Do you have funds to cover any extra costs associated with this request (i.e.: special analysis, meeting costs, translation)?

☐ Yes

If yes, please elaborate.

☒ No

Branch Approval

Approval Date	Name of Director (or Delegated Authority)	Submission Date
2018-05-30	Ray Finn	

Approved request forms are to be submitted to the CSA/CSAS Coordinator in your region.

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice:

Section #	Section Title	Specific Subsections
2.4.	Project Description	2.4.1.1. 2.4.2.2.
2.5.	Sea Cage Sites	2.5.2.
2.7.	Alternatives	2.7.3.
2.8.	Accidents and Malfunctions	2.8.1. 2.8.2. 2.8.3.
3.3.	Valued Environmental Components	3.3.2.
4.2.	Aquatic Existing Environment	4.2.1. 4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4 4.2.3. 4.2.4.
4.8.	Data Gaps	4.8.1. 4.8.2.
7.0.	Effects of the Project on the Environment	7.2.
7.6.	Cumulative Effects	7.6.4. 7.6.5.2.
7.7.	Accidents	7.7.1.
7.8.	Follow-up Monitoring	7.8.1. 7.8.2.
7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.
8.0.	Environmental Protection	
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>	

In particular, DFO has been requested to provide advice on:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments is June 27, 2018

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Kelly, Jason

From: Kelly, Jason
Sent: May-31-18 9:59 AM
To: Finn, Ray
Subject: RE: Files in Play - NEMO round table yesterday

NHQ are aware of Old Harry, I've cc'd Helene on our correspondence with the Gulf and Quebec last week. I am meeting with Tania Gordanier (Major Projects) next week when she is here (as part of the FPP meeting) to brief her on Old Harry and other projects including Grieg

I will set up a meeting with Jackie and RDs for early next week, was waiting on Agreement to be signed.

Jason

From: Finn, Ray
Sent: May-31-18 9:50 AM
To: Kelly, Jason
Subject: Files in Play - NEMO round table yesterday

On yesterday's NEMO call I referenced 2 files "in play" that are and will be contentious

Greig and Old Harry

I presume folks at HQ are aware ?? thinking Tania etc

Thks Jason

Ray

Ps – let's not forget the plan to brief Jackie and implicated RD's as get into the EIS review – ok?

Ray Finn
Regional Director / Directeur régional
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada / Pêches et Océans Canada
PO Box 5667 / CP 5667
St. John's NL A1C 5X1 / St. John's T. N.-L. A1C 5X1
Tel | Tél : (709) 772 2442
Fax / Télé: (709) 772 7862

Kelly, Jason

From: Kelly, Jason
Sent: May-31-18 11:35 AM
To: Pike, Kelly J
Subject: CSAS Request Grieg Aquaculture
Attachments: Request for Science Advice Grieg.pdf

Kelly, see the attached "Request for Science Advice" and message below for the Grieg EA. Can you confirm that this would go from Ray to Barry

Jason

Barry,

Please see attached "Request for Science Advice" related to the Environment Impact Statement for the proposed Grieg Aquaculture facility in Placentia Bay. The EA review is being coordinated the Fisheries Protection Program who will work directly with the CSAS office and Science staff to provide guidance on the review and answer any questions.

Jason Kelly

A/ Manager – Regulatory Review
Fisheries Protection Program, Ecosystems Management Branch
Fisheries and Oceans Canada, Government of Canada
P.O. Box 5667, St. John's, NL A1C 5X1
Ph: (709) 772-4126
Email: jason.kelly@dfo-mpo.gc.ca

**Pages 28 to / à 29
are duplicates of
sont des duplicatas des
pages 22 to / à 23**

Abbott, Melissa H

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason; Coffin, David (David.Coffin@dfo-mpo.gc.ca); Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: FW: Grieg Aquaculture
Attachments: Request to FAM BBP.docx

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>

Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>

Subject: Grieg Aquaculture

Please see attached request for review. If anyone in your Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson

Sr. Biologist - Mining

Fisheries Protection Program

Dept. of Fisheries and Oceans

Telephone: (709)772-3296 (O) [REDACTED] (cell)

s.16(2)(c)

E-mail: Roger.Johnson@dfo-mpo.gc.ca

No further information has been removed or severed from this page

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

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DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Fisheries Management Branch advice:

Section #	Section Title	Specific Subsections
2.8	Accidents and Malfunctions	2.8.5.
4.4.	Land and Resource Use	4.4.1. 4.4.2.
7.8.	Follow-up Monitoring	
8.0	Environmental Protection	

In particular, DFO has been requested to provide advice on:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined;
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments is June 26, 2018

Meade, James

From: Hamoutene, Dounia
Sent: May-31-18 11:57 AM
To: Meade, James; Grant, Carole; Clarke, Keith
Subject: RE: Request for advice Grieg Aquaculture

_____ Hi Jim

Not back in NL yet. It'll have to wait until next week for me Thanks _____

From: Meade, James
Sent: May 31, 2018 9:49 AM
To: Hamoutene, Dounia; Grant, Carole; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

Would like to meet with you to discuss this request.

The review time would be very short (2 weeks) as this would entail a Science Response Process with a SR Report as the product, and we have been requested to deliver by June 27 (4 weeks from today!) FYI - I have reviewed the ToC and determined the volume of the report that would require review from each of your Sections.

Please advise when you have a few minutes to spare to discuss with me - hopefully today or tomorrow.

Thanks and Cheers,
Jim

From: Johnson, Roger
Sent: May-30-18 1:33 PM
To: Meade, James
Cc: Pilgrim, Bret
Subject: Request for advice Grieg Aquaculture

Please see attached documents; one is the request form the other is the list of appropriate sections. If you or staff in your branch would like to comment on other sections please feel free to do so.

This is the informal submission to allow the start of this process while the official request is going for signature hopefully today.

If there are any questions now or during this process please feel free to direct them to me anytime. I will be discussing this with Carol the next time I see her.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca<<mailto:Roger.Johnson@dfo-mpo.gc.ca>>

Kelly, Jason

From: Kelly, Jason
Sent: May-31-18 3:18 PM
To: Pilgrim, Bret
Cc: Johnson, Roger
Subject: RE: Memo - Placentia Bay Atlantic Salmon Aquaculture Project
Attachments: Request to Science.docx

The CSAS request will be sent from Ray to Jim today. Can one of you touch base with Jim and provide him the attached. I didn't include it in the request

jason

From: Pilgrim, Bret
Sent: May-30-18 3:42 PM
To: Kelly, Jason
Cc: Johnson, Roger
Subject: Memo - Placentia Bay Atlantic Salmon Aquaculture Project

Jason,
Please see the attached for review.

Let us (Roger...) know if there are any questions

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

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DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

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	<i>Component Study: Wild Atlantic Salmon + Appendices</i>	

In particular, DFO has been requested to provide advice on:

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- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments is June 27, 2018

No information has been removed or severed from this page

From: [REDACTED]
Sent: Friday, June 1, 2018 7:19 AM
To: EA Project Comments
Subject: Grieg Seafarms

We strongly support the proposed project by Grieg NL for our region. Its economic And social benefits will strongly enhance the region and province as a whole. The recent closure of the wild salmon stocks in Greenland proves that salmon Farming is not the cause of low salmon returns to rivers, but over fishing is to blame. We strongly urge the government to green light this project ASAP!!!

Sent from Mail for Windows 10

s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Friday, June 1, 2018 9:46 PM
To: EA Project Comments
Subject: Greg aquaculture.

Follow Up Flag: Follow up
Flag Status: Completed

I have overwhelming support for the project, not only for Marystown, but for the economic growth that this project can bring to the island. With the recent moratorium placed on the Greenland commercial salmon fishery, it goes to say that aquaculture is not the problem with our wild salmon stocks, but over fishing. This project needs to proceed.

[REDACTED]

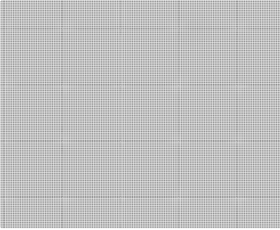
s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Thursday, June 7, 2018 10:47 AM
To: EA Project Comments
Subject: Placentia Bay salmon aquaculture project.

Follow Up Flag: Follow up
Flag Status: Flagged

[REDACTED] on the Burin Peninsula and I am 100% in support of this project! Please allow the company to move forward with their plans with the development of the hatchery, and all other future plans related to the sea cages and salmon processing



s.19(1)

From: [REDACTED]
Sent: Friday, June 8, 2018 8:28 AM
To: EA Project Comments
Subject: Grieg NL Placentia Bay Salmon Aquaculture Project

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning Joanne,

Please accept this email as my approval and support of the Grieg NL project proposed for the Burin Peninsula ie Placentia Bay.

[REDACTED] this project will provide well needed jobs and from all the information and presentations I have attended it appears that Grieg NL has followed all the required regulations and have provided all the necessary information that indicates that there will be no adverse effect on the environment.

I feel this project should be approved and the construction of such facility on the land and water be approved by the Province of NL.

Thank you,

[REDACTED]

The information contained in this communication is confidential and intended only for the use of those to whom it is addressed. If you have received this communication in error, please notify me by telephone (collect if necessary) and delete or destroy any copies of it. Thank you.

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s.19(1)

From: [REDACTED]
Sent: Friday, June 8, 2018 1:40 AM
To: EA Project Comments
Subject: Greig NL, Placentia Bay Atlantic Salmon Aquaculture Project

Follow Up Flag: Follow up
Flag Status: Flagged

To whom it may concern:

I am writing to indicate my support for the aquaculture project referenced above and the aquaculture industry generally. Greig NL have presented information at several public forums that I have attended. The information provided and information that I have sought out through online research leads me to support this initiative. The company proposes to use the best technology and they should be accountable to keep this commitment. The fear mongering in the media by many is not helpful. I encourage the review panel to allow this project to proceed. Conditions should be put in place to ensure practices used are the best in the industry. The regulatory responsibility of the provincial government should have personnel onsite during the operation to ensure all Greig, NL, commitments are met. PROCEED with due care and caution but proceed ASAP!

Thanks you for your consideration of public opinion.

[REDACTED]

[REDACTED]

s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Friday, June 8, 2018 10:30 AM
To: EA Project Comments
Subject: Grieg Project

Dear Ms. Sweeney,

I wish to register my personal support for the Grieg NL, Placentia Bay Atlantic Salmon Aquaculture Project.

I am satisfied the approach they are taking is one that takes environmental concerns very seriously and their plans for an ultra-modern operation will be a much needed boost to the economy of the Burin Peninsula.

I encourage your committee to recommend approval of the project.



s.19(1)

From: [REDACTED]
Sent: Saturday, June 9, 2018 1:56 PM
To: EA Project Comments
Subject: my public opinion of the Placentia Bay aquaculture

Follow Up Flag: Follow up
Flag Status: Flagged

[REDACTED] I am a supporter of this project the fishery as we know it has changed [REDACTED]

[REDACTED] all I hear is

escapes yes farm salmon do escape but that is a lot of possible but I do know that Ice conditions can cause damage to any cages but that is again a lot of what ifs the economy don't need to be held Hostage by a bunch of Environmental Tree Huggers this project is a savior the Burin Peninsula Chamber of commerce just added Grieg NL as a Member do you think that the Chamber of commerce would add a potential bad company to the association I think Not so going forward I like the courts to stay out of future decisions Gillian Buttler the Judge who ordered this EIS statement do she know what a Salmon is and how to get up at 4 AM and go out on the cold waters to make a living I think I know the answer to this so to you Honor Gillian Buttler you focus on putting away criminals and allowing different Evidence and let us people who know more about the fishing business

s.19(1)



Burin Peninsula
CHAMBER OF COMMERCE

P.O. Box 728
Marystown, NL A0E 2M0
burinpeninsulachamber@outlook.ca

10 June, 2018

Ms Joanne Sweeney, Project EA Chair
Placentia Bay Atlantic Salmon Aquaculture Project
Department of Municipal Affairs and Environment
Confederation Building, 4th Floor, West Block
P O Box 8700
St. John's, NL
A1B 4J6

Re: Grieg Project in Placentia Bay

The Placentia Bay region and surrounding environs has provided food for the people of the planet for 500-years. Popular opinion of the day, indicated there seemed no end to the amount of fish available in the bays and on the Grand Banks.

Now after 25-years in moratorium, we are still jittery about the resurgence of a cod fishery ... but thankfully, we do have a solution.

As a renewable industry, aquaculture can now provide protein and nutrients well into the future. It is the fishery of the future.

The Grieg project in Placentia Bay is our best hope.

It is an opportunity which may not present itself again.

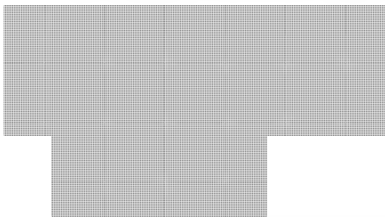
This area had a positive cash-flow over the past 75-years, with the Argentia Base, Alcan in St Lawrence, ERCO and Vale in Long Harbour, Marystown Shipyard, Come-by-Chance Refinery, Oil Transshipment, (and fish plants in Arnold's Cove, Burin, Grand Bank, Fortune, and Marystown, each with a full compliment of trawlers).

The economy came crashing down with the collapse of the cod fishery. Since the 90's, we have seen mass unemployment followed by mass exodus. The population of the Burin Peninsula now sits at about 20,350. We need to start building again. There are many opportunities awaiting.

From the Chamber's perspective, the Grieg project cannot continue to be held in limbo. All has been said - over and over. Politicians and protesters have voiced their opinions. Conferences and town hall meetings have been held. Due diligence has been done. Time to move on.

Let's get the shovels in the ground, put people to work, and salmon on the market.

We support the Grieg Atlantic Salmon Aquaculture Project



Burin Peninsula Chamber of Commerce

Marystown Hotel & CONVENTION CENTRE

P. O. Box 487, 76 Ville Marie Drive, Marystown, NL A0E 2M0

June 11, 2018

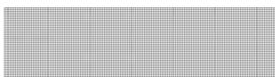
Reference to: The Grieg NL, Placentia Bay Atlantic Salmon Aquaculture Project

To: Whom it may Concern

I am aware of the concerns put forward regarding the Grieg NL Atlantic Salmon Aquaculture Project. However, this company has done whatever has been asked of them by the Government and other Departments to prove their interest in the project for the Burin Peninsula and Placentia Bay.

I feel this project would help the economic growth for this area in numerous ways, hundreds of jobs, development of other businesses and help save existing businesses.

This project needs to go ahead!



Marystown Hotel & Convention Centre

From: town council <townofwinterland@hotmail.com>
Sent: Thursday, June 14, 2018 4:50 PM
To: EA Project Comments
Subject: Letter of Support

To Whom It May Concern:

The Town Council of Winterland would like to offer support for the Grieg NL, Placentia Bay Atlantic Salmon Aquaculture Project.

Thank you,

Ginger Walsh, Administrative Assistant
Town of Winterland
Box 10, Winterland, NL, AOE 2Y0
(P) 279-3701 (F) 279-3702

William Cheeseman
President



Jim Knight
Secretary

Lions Club of Marystown Inc.

P.O. Box 277
Marystown, NL A0E 2M0
marystownlions@live.ca

2018-06-14

Joanne Sweeney, Project EA Chair
Placentia Bay Atlantic Salmon Aquaculture Project
Department of Municipal Affairs and Environment
P. O. Box 8700
St. John's, NL A1B 4J6

Dear Ms. Sweeney:

We, the members of the Lions Club of Marystown have become Lions because we are concerned with the wellbeing of the citizens of Marystown, Burin & the surrounding communities. At the Zone level, the eight Lions Clubs on the Burin Peninsula work together in various ways to address the needs of our region, as we do also at the District, provincial, national and international levels.

While most of our service as a club is focused on the specific needs of individuals, we are involved as well in more general forms of service in areas such as health care, youth, seniors and the environment. While economic issues are not specifically within our purview, we are (or have been) either employers or employed in this region; also, it is quite obvious that no community can sustain itself unless there is full-time employment available. Further, many members of our Lions Clubs throughout the province have served on municipal councils, chambers of commerce and other such organizations which do directly concern themselves with economic matters, and so are in a position where we can bring this information to our clubs.

Thus, we write you at this time to express our support for the Grieg NL Seafarms project in Marystown and Placentia Bay. Several of our members have been following the development of this project since its inception, and are convinced that the company is a responsible corporate citizen, that the project is economically viable on a long-term basis, that every aspect of this project is absolutely "state of the art" as regards safety and the environment, and that Grieg's commitment to all this will survive into the future. We are all convinced that this project will greatly contribute to the economic stability in our town and region.

... p.2



"TOGETHER"
*We will harness the power of we.
We will commit to action.
We will leave the world a better place for all.*



2018-06-14
Joanne Sweeney

- 2 -

The communities of rural Newfoundland and Labrador, and especially we on the Burin Peninsula, are facing severe demographic challenges. Without vibrant, year-round, economically sustainable rural communities, our province will lose its unique character – the very thing which makes it “a great place to live, work, do business and visit.” The Aquaculture Project will lead to permanent, long-term employment (at all levels) here in Marystown, but also opportunities for people in several small communities on both sides of Placentia Bay. It will provide opportunities in other communities in the region (notably, the fishplants in St. Lawrence and Fortune); it has the potential for the growth and development of other related industries (feed production, which could serve all of Eastern Canada and the Atlantic seaboard); it will enable the start-up of various ancillary service industries. Without such industries providing employment, it is impossible to imagine our region surviving.

We recognize that, as in everything, there are risks. We submit that to deny approval to this project would entail a grave risk to the sustainability of our communities and our region. We urge your committee, therefore, to act swiftly in granting final approval so that this promising industry may proceed and our communities may reap the benefits.

This letter is written on behalf of all members of our Lions Club and was approved unanimously at our Regular Meeting held 2018-06-12.

Yours sincerely,



Cc: Town Council, Town of Marystown
Mark Browne, MHA
Carol Ann Haley, MHA
Churance Rogers, MP
Grieg NL Seafarms Ltd.

s.19(1)



June 14, 2018

Ms. Joanne Sweeney, Project EA Chair
Placentia Bay Atlantic Salmon Aquaculture Project
Department of Municipal Affairs and Environment
Fourth Floor, West Block Confederation Building
P.O. Box 8700
St. John's, NL
A1B 4J6

Re: Placentia Bay Atlantic Salmon Aquaculture Project

Dear Ms. Sweeney:

Aquaculture is the farming of fish, shellfish and plants in an aquatic environment and has been practiced around the world for thousands of years. In fact, historical records show that China was growing carp as early as 1100 BC. (www.fao.org). Similar to terrestrial farming, modern day aquaculturists practice crop rotation and fallowing to mitigate the impacts on the environment. As well, Bay Management Areas and biosecurity protocols are utilized to decrease the possibility of the spread of any disease or cross contamination of any kind. New technologies in feeding, site monitoring, containment and aquatic health monitoring systems and practices are used every day to ensure the security of the investment by entrepreneurs.

The Fisheries and Agriculture Organization of the United Nations is projecting the world population to climb to more than 9 billion by 2050. In 2014, the supply of fish for human consumption by aquaculture exceeded that provided by the wild catch fishery which is declining as a result of overfishing and climate change. Aquaculture is the sector which will provide the world's growing population with seafood protein well into the future.

Here in Newfoundland and Labrador, we have an opportunity to capitalize on this global opportunity which will provide economic sustainability for many of our rural coastal communities. We have been growing the aquaculture sector since the mid-1980s and we have in place legislation and protocols which ensure the safe practice of aquaculture for the people and the environment.

Great Business! Great Living!


P.O. Box 430, Grand Bank, Newfoundland and Labrador, Canada A0E-1W0 Tel: (709) 832-3235 Fax: (709) 832-3225
www.gbdc.ca

The Grieg NL project will provide long term, continuous sustainable employment and business development opportunities throughout the Burin Peninsula and indeed the whole province. According to the Economic Impact Assessment Study of the project conducted by Barry Sheppard Management Consulting for the Burin Peninsula Chamber of Commerce in 2016, it is projected that the project will provide 576 direct employment and 460 indirect and induced jobs. It will have an annual impact on the GDP of the province estimated to be valued at \$150 million.

The Grand Bank Development Corporation fully supports the efforts of Grieg NL to develop the aquaculture sector in Placentia Bay and looks forward to the continued growth of the sector across the province. We encourage government to consider the well-being of rural Newfoundland and Labrador and move forward with the approval of this project in an expeditious manner.

Sincerely,


Darrell LaFosse, Chairperson
Grand Bank Development Corporation

cc: Hon. Dwight Ball, Premier, Newfoundland and Labrador
Mr. Churence Rogers, MP, Bonavista-Burin-Trinity
Hon. Andrew Parsons, Minister (Acting), Department of Municipal Affairs and Environment
Hon. Christopher Mitchelmore, Minister, Department of Tourism, Culture, Industry and Innovation
Ms. Carol Anne Haley, MHA, Grand Bank-Burin
Mr. Mark Browne, MHA, Placentia West-Bellevue
 Grieg NL
Mr. Rex Matthews, Mayor, Town of Grand Bank

s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Friday, June 15, 2018 3:16 PM
To: EA Project Comments
Subject: PB Atlantic Salmon Project

I am in support for the Grieg NL, Placentia Bay Atlantic Salmon Aquaculture Project, please forward this letter to the Environmental Committee

It's long enough waiting, we have an ice free harbour, people on the peninsula willing to work.

Give the peninsula some stability.

We have a world of starvation,
Imagine feeding the human race

Regards,
[REDACTED]

s.19(1)



P. O. Box 487, 76 Ville Marie Drive, Marystown, NL A0E 2M0

June 20, 2018

Reference to: The Grieg NL, Placentia Bay Atlantic Salmon Aquaculture Project

As we are all aware there are individuals and business who have expressed concerns with the Grieg NL Atlantic Salmon Aquaculture Project.

However, Grieg NL Atlantic Salmon Aquaculture has been very diligent in complying with whatever has been asked of them by all Government Departments to prove their interest and commitment in this project for the Burin Peninsula and Placentia Bay.

I feel there are many benefits to be had from this project.

I am certain that I would not be alone in supporting the positive aspects of this project to this region, including the economic growth and job creation and even potentially new businesses.

Our region needs this project.



Marystown Hotel & Convention Centre

Sweeney, Joanne

From: [REDACTED]
Sent: Thursday, June 28, 2018 11:39 AM
To: EA Project Comments
Subject: I support Grieg NL

Follow Up Flag: Follow up
Flag Status: Flagged

I support and encourage the Grieg NL project to go through. Our provinces economy needs all the help it can get and to turn away from an opportunity for Newfoundlands to stay in Newfoundland helps not only the ones working there but everyone trying to keep Newfoundland their home.

Thank you.

[REDACTED]

s.19(1)

From: [REDACTED]
Sent: Thursday, June 28, 2018 11:37 AM
To: EA Project Comments
Subject: Environmental Assessment of Grieg NL

Hi there,

I would like to send support for the Grieg NL project and ask the committee to release it as soon as possible. I believe it would be an amazing opportunity for the province and would allow us to catch up with the rest of the world in this industry. Newfoundland needs a much more diverse economy and I feel that this project would be great for our future generations!

I sincerely hope that the committee makes the right decision.

Thanks, [REDACTED]

s.19(1)

Morris, Robyn

From: Morris, Robyn
Sent: Friday, June 1, 2018 8:48 AM
To: Rumbolt, Annette
Subject: RE: Grieg Aquaculture

Thanks! I'll have a read of it!

Robyn Morris
Regional FM Officer
Fisheries Resource Management

Phone: (709) 772.8859
e-mail: robyn.morris@dfo-mpo.gc.ca

From: Rumbolt, Annette
Sent: Friday, June 1, 2018 8:40 AM
To: Morris, Robyn <Robyn.Morris@dfo-mpo.gc.ca>
Cc: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Robyn, we often get asked to review the FM pieces of proposals, etc – such as the attached. Just sending FYI. If you have any questions you can talk to me or Melissa.

Annette

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason <Jason.Simms@dfo-mpo.gc.ca>; Coffin, David <David.Coffin@dfo-mpo.gc.ca>; Dunne, Erin <Erin.Dunne@dfo-mpo.gc.ca>; Ball, Dave <Dave.Ball@dfo-mpo.gc.ca>; Penney, Kim <Kimberley.Penney@dfo-mpo.gc.ca>; Hawkins, Laurie <Laurie.Hawkins@dfo-mpo.gc.ca>; Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>
Cc: Burton, Ron <Ron.Burton@dfo-mpo.gc.ca>; Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Rumbolt, Annette <Annette.Rumbolt@dfo-mpo.gc.ca>; Cahill, Paul <Paul.Cahill@dfo-mpo.gc.ca>; Walsh, Ray <Ray.Walsh@dfo-mpo.gc.ca>; Tobin, Derek (Duke) <Derek.Tobin@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in you Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Kelly, Jason
Sent: Friday, June 1, 2018 9:10 AM
To: Johnson, Roger
Subject: FW: CSAS request submission from EM Branch
Attachments: CSAS request 2018-Review section of the EIS of PB Atlantic Salmon-June 1, 2018.pdf

Fyi...

From: Pike, Kelly J
Sent: June-01-18 9:08 AM
To: Meade, James
Cc: Kelly, Jason
Subject: CSAS request submission from EM Branch

Jim, see attached CSAS submission from Fisheries Protection-Regulatory Review .

I will provide you the hard copy shortly.

Thanks,

Kelly Pike
Administrative Officer, Ecosystems Management
Regional Director's Office
Fisheries and Oceans Canada/Government of Canada
80 East White Hills Road, PO Box 5667
St. John's, NL A1C 5X1
Kelly.Pike@dfo-mpo.gc.ca /Tel: 709 772-7894/Fax: 709 772-7862/Cell: [REDACTED]

s.16(2)(c)



REQUEST FOR PEER REVIEWED SCIENCE INFORMATION AND/OR ADVICE

Title of Request Review appropriate section of the Environmental Impact Statement of Placentia Bay Atlantic Salmon Aquaculture Project	(For internal use only)
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Branch Contact

Name Roger Johnson	Title Senior Fisheries Protection Biologist
Telephone Number (709) 772-3296	Email Roger.Johnson@dfo-mpo.gc.ca
Region NL	Sector Ecosystems and Fisheries Management
Directorate Fisheries Protection - Regulatory Reviews	Branch Ecosystem Management

Request Details

Issue requiring science information and/or advice (i.e., "the question" or "the need"). Posed as a question to be answered by Science.
Grieg NL is proposing the Placentia Bay Atlantic Salmon Aquaculture Project consisting of a land based hatchery and 11 sea cage sites in the northern portion of Placentia Bay. The proponent has submitted an EIS to the Province of NL. DFO as an expert department is a member of the EA Committee and will provide expert advice related to the assessment. FPP is coordinating the internal EA review and is requesting that Science Branch review the appropriate sections of the EIS.

Rationale or context for the request: What will the information/advice be used for? Who will be the end user(s)? Will it impact other DFO programs or regions?
The advice received will be part of a thorough scientific and technical review of the EIS and will allow provision of appropriate comments to the Province on the assessment of impacts and mitigations to fish, fish habitat, species at risk, special marine areas and fisheries. The end user of the input from Science will be the Province of NL EA Committee.

Additional Information (please be as concise as possible)

What is the expected course of action if science advice is not provided? Could this negatively affect species, habitat(s) or ecosystem(s) of concern?
If Science advice is required and not provided, the advice from DFO to the Province of NL may lack appropriate level of scientific rigor.

Will this request help DFO move towards an ecosystem approach to management? For example, does this request relate to overarching national objectives of conserving biodiversity, productivity or habitat, or more specific bioregional ecosystem objectives (if they exist)?
Are there specific ecosystem considerations that should be taken into account?

☐ Yes If yes, please elaborate.
☒ No



Is the provision of this information/advice required to meet a legal or regulatory requirement?	
<input type="radio"/> Yes	If yes, please elaborate.
<input checked="" type="radio"/> No	
Does this issue have public, media and/or government (outside DFO) interest or involvement at the local, regional, national or international level?	
<input checked="" type="radio"/> Yes	If yes, please elaborate.
<input type="radio"/> No	Other federal and provincial government agencies - e.g. Environment and Climate Change Canada, Transport Canada, NL Department of Municipal Affairs and Environment, NL Department of Fisheries and Land Resources - will be involved in the review of the project EA. This project has attracted a significant amount of media attention and has been subject to a court challenge - that court ruling is now under appeal.
Is the provision of this information/advice required to support a departmental priority?	
<input checked="" type="radio"/> Yes	If yes, describe which priority and provide a short rationale.
<input type="radio"/> No	Supports departmental priorities related to sustainable development.
Is the provision of this information/advice required to respond to or meet an international commitment?	
<input type="radio"/> Yes	If yes, which commitment?
<input checked="" type="radio"/> No	

Administrative Details

Deadline

Latest Possible Date to Receive Science Advice
June 27, 2018
Rationale
The comment period for the EIS closes July 11 and DFO-FPP will need time to collate comments from Science and other sectors.

Funding

Do you have funds to cover any extra costs associated with this request (i.e.: special analysis, meeting costs, translation)?	
<input type="radio"/> Yes	If yes, please elaborate.
<input checked="" type="radio"/> No	

Branch Approval

Approval Date	Name of Director (or Delegated Authority)	Submission Date
2018-05-30	Ray Finn 	JUN - 1 2018

Approved request forms are to be submitted to the CSA/CSAS Coordinator in your region.

Roach, Jody

From: Roach, Jody
Sent: Friday, June 1, 2018 9:19 AM
To: Walsh, Jerry
Subject: RE: Grieg Aquaculture

Will do ☺

From: Walsh, Jerry
Sent: Thursday, May 31, 2018 1:35 PM
To: Roach, Jody <Jody.Roach@dfo-mpo.gc.ca>; Shea, Paul <Paul.Shea@dfo-mpo.gc.ca>; Warren, Janet <Janet.Warren@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

For your review and comments, will you take the lead on this one Jody...tx

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason; Coffin, David; Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

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4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in you Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Page 63
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page 32

Kelly, Jason

From: Kelly, Jason
Sent: June-01-18 9:27 AM
To: Hendry, Christopher
Subject: grieg update fopr AES - accurate

Grieg NL Placentia Bay Project Environmental Assessment	On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment. This action has initiated the start of a 50 day public review process and a review by expert departments and agencies including DFO.	DFO have initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. DFO will also identify measures to mitigate any adverse effects.	DFO will provide comments to the Environmental Assessment Committee who will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal Affairs and Environment. The provincial minister of Municipal Affairs and Environment's decision on the acceptability of the EIS is due on July 31, 2018. The minister's recommendation to provincial Cabinet is due by August 30, 2018, and Cabinet will inform the proponent of its decision, for which there is no deadline.
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Jason Kelly
A/ Manager – Regulatory Review
Fisheries Protection Program, Ecosystems Management Branch
Fisheries and Oceans Canada, Government of Canada
P.O. Box 5667, St. John's, NL A1C 5X1
Ph: (709) 772-4126
Email: jason.kelly@dfo-mpo.gc.ca

Kelly, Jason

From: Kelly, Jason
Sent: June-01-18 11:20 AM
To: Pike, Kelly J
Subject: FW: Week of June 4th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Attachments: AES for June 11.docx

See attached

From: Pike, Kelly J
Sent: May-31-18 10:24 AM
To: Hendry, Christopher; Sullivan, Katrina; Kelly, Jason; Van Ingen, Richard; Powell, Shawna; Snow, Stephen
Cc: Bieger, Tilman; Finn, Ray; Griffiths, Helen; Tulk, Kirby
Subject: FW: Week of June 4th - AES Issues, Reports and Consultations Report / Upcoming Decisions

For your input and/or Nil response to me before **Noon-Friday June 1.**

From: Genier, Sylvie
Sent: Thursday, May 31, 2018 10:00 AM
To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Cochrane, Kim <Kim.Cochrane@dfo-mpo.gc.ca>; Hickson, Cindy <Cindy.Hickson@dfo-mpo.gc.ca>; Rossignol, Pauline <Pauline.Rossignol@dfo-mpo.gc.ca>; Wilson, Teresa M <Teresa.Wilson@dfo-mpo.gc.ca>; XCA-Grp, RDGO <XCA-Grp-RDGO@dfo-mpo.gc.ca>; Johal, Sharan <Sharan.Johal@dfo-mpo.gc.ca>; Hébert, Linda M <Linda.Hebert@dfo-mpo.gc.ca>; Pallard, Jessica <Jessica.Pallard@dfo-mpo.gc.ca>; Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Couturier-Dubé, Geneviève <Genevieve.Couturier-Dube@dfo-mpo.gc.ca>; Kaba, Kyle <Kyle.Kaba@dfo-mpo.gc.ca>; Landry, Anne <Anne.Landry@dfo-mpo.gc.ca>
Subject: Week of June 4th - AES Issues, Reports and Consultations Report / Upcoming Decisions

Hi all / Bonjour,

**Please note this request is for items pertaining to Aquatic Ecosystems Sector only /
Veuillez noter que cette demande concerne uniquement les articles appartenant au secteur des écosystèmes aquatiques**

Please update (in the language of your choice) the attached report with a regional perspective and return to me **by 10am Monday, June 4th (Eastern Time).**

Please note if no response is received by the timeline provided, it will be considered a NIL response.

Veuillez fournir vos données (dans la langue de votre choix), incluant la perspective régionale pour le rapport ci-joint **par 10h00 lundi le 4 juin. (heure de l'est).**

S'il vous plaît noter si aucune réponse n'est reçue par le temps fourni, il sera considéré comme une réponse NUL.

Thank you/Merci.

Sylvie Genier
Scheduling Coordinator / Coordinatrice de l'agenda

Senior Assistant Deputy Minister / Bureau du sous-ministre adjoint
Ecosystems & Fisheries Management / Écosystèmes et Gestion de Pêches
613-993-2734

=====

Guidelines for Issues, Reports & Consultations report / Lignes directrices pour le rapport d'enjeux, de rapports et de consultations:

Issues expected for the next two weeks (from June 11 – June 22, 2018)
Enjeux prévus pour les prochaines deux semaines (à partir du 11 juin – 22 juin 2018)

Anticipated reports, studies, publications, etc. Please identify any reports expected for public release whether they are from DFO or from others but with implications for DFO (to be released before June 22, 2018).

Rapports anticipés, études, publications, etc. Veuillez identifier tous les rapports en attente pour publication - même s'il s'agit d'un rapport du MPO ou provenant d'autres organismes avec des implications pour le MPO (date de publication avant le 22 juin 2018).

Meetings/consultation planned for June 11 – June 22, 201

Rencontres/consultations prévues pendant la période à partir du 11 juin – 22 juin 2018

Please provide **ONLY** information that the Minister and/or Minister's Office should be made aware of because of the potential for it to attract public or media attention. For issues, please explain why it is an issue, anticipated reaction and plans to manage the reaction. Please ensure your input is signed off by your DMB member.

When you transmit the info, please indicate which issues, reports or consultations should be included in the Week at a Glance - these are the same issues that the Commissioner or SADM will be raising during the Round Table.

Veuillez fournir uniquement les renseignements dont le ministre ou le bureau du ministre devraient prendre connaissance parce qu'ils peuvent potentiellement attirer l'attention du public ou des médias. En ce qui concerne les enjeux, veuillez expliquer pourquoi il s'agit d'un enjeu, quelle est la réaction anticipée et quels sont les plans devant servir à gérer cette réaction. Veuillez-vous assurer que votre contribution est signée par votre membre du Conseil du ministère.

Lorsque vous transmettez les renseignements, veuillez indiquer quels enjeux, rapports ou consultations devraient être inclus dans le Coup d'œil sur la semaine – ceux-ci correspondent aux enjeux que le Commissaire ou le Sous-ministre adjoint principal soulèveront durant la table-ronde.

TAB 10 - UPCOMING ISSUES AND DECISIONS / ONGLET 10 – PROCHAINS ENJEUX ET DÉCISIONS

SECRET		
#	ISSUE / PROBLÈME	DESCRIPTION

Aquatic Ecosystems Sector / Secteur des écosystèmes aquatiques – June 11th to June 22nd / du 11 juin au 22 juin

IMPACT / EFFET		NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
Grieg NL Placentia Bay Project Environmental Assessment	On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment. This action has initiated the start of a 50 day public review process and a review by expert departments and agencies including DFO.	DFO have initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. DFO will also identify measures to mitigate any adverse effects. The Provincial Minister of Municipal Affairs and Environment's decision on the acceptability of the EIS is due on July 31, 2018. The minister's recommendation to provincial Cabinet is due by August 30, 2018, and Cabinet will inform the proponent of its decision, for which there is no deadline.
Saint-Pierre-et-Miquelon Fibre Optic Cable Project	In June, 2017, the Fisheries Protection Program (FPP) received a request from Collectivité Territoriale de Saint-Pierre-et-Miquelon to review the placement of a portion, in Canadian waters, of an underwater fiber optic cable from Fortune, Newfoundland and Labrador to Saint Pierre and Miquelon, France. FPP determined that no FA Authorization was required as no serious harm to fish or fish habitat is expected from the cable installation. The project was originally scheduled to be completed in the Fall 2017, however the project was delayed and is scheduled to start in the near future (June 2018).	DFO does not play a role in managing the interactions between harvesters and proponents conducting works undertaking or activities. Proponent lead consultations with harvesters typically result in agreement to project timing to avoid any potential interactions Fisheries Management (i.e. Conservation and Protection and Resource Management) are aware of the situation.

**TAB 10 - UPCOMING ISSUES AND DECISIONS /
ONGLET 10 -- PROCHAINS ENJEUX ET DÉCISIONS**

SECRET			
#	ISSUE /PROBLÈME	DESCRIPTION	NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
		The proponent also submitted the project for review to Innovation, Science and Economic Development Canada in order to obtain a license to construct/operate an international submarine cable which comes under Canadian jurisdiction.	

Meade, James

From: Meade, James
Sent: June-01-18 2:24 PM
To: McCallum, Barry; Davis, Ben; Mansour, Atef A H
Cc: Richards, Dale E; Parrill, Erika
Subject: FW: Request for advice Grieg Aquaculture

FYI. Another process to add to our schedule!

Atef: Dounia will determine if the oceanography bits will be addressed by her Section or if I will need to tap Guoqi for those sections, as discussed.

Cheers,
Jim

From: Meade, James
Sent: June-01-18 2:20 PM
To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques
 Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
 Fisheries and Oceans Canada / Pêches et Océans Canada
 80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
 Tel: (709) 772-3332
 Fax/ Télécopieur: (709) 772-6100
 E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

Section #	Section Title	Specific Subsections	Relevant Science Section to review/ provide advice
2.4.	Project Description	2.4.1.1. 2.4.2.2.	Aquaculture Aquaculture
2.5.	Sea Cage Sites	2.5.2.	Aquaculture/ Salmonids?
2.7.	Alternatives	2.7.3.	Aquaculture
2.8.	Accidents and Malfunctions	2.8.1. 2.8.2. 2.8.3.	Aquaculture/ Salmonids
3.3.	Valued Environmental Components	3.3.2.	Salmonids
4.2.	Aquatic Existing Environment	4.2.1. 4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4 4.2.3. 4.2.4.	Aquaculture or Oceanography? Ecological Sciences Salmonids
4.8.	Data Gaps	4.8.1. 4.8.2.	Ecological Sciences Salmonids
7.0.	Effects of the Project on the Environment	7.2.	Salmonids
7.6.	Cumulative Effects	7.6.4. 7.6.5.2.	Aquaculture/ Salmonids Salmonids
7.7.	Accidents	7.7.1.	Salmonids/ Aquaculture
7.8.	Follow-up Monitoring	7.8.1. 7.8.2.	Aquaculture/ Salmonids Aquaculture/ Salmonids
7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.	Salmonids Salmonids/ Aquaculture Salmonids/ Aquaculture Salmonids/ Aquaculture
8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture

Hamoutene, Dounia

From: Hamoutene, Dounia
Sent: June-01-18 2:59 PM
To: Ratsimandresy, Andry; Donnet, Sebastien G
Subject: FW: Request for advice Grieg Aquaculture

Hi Sebastien, Andry,

See below in yellow parts of the Grieg Environmental Assessment for you to go through for your input/comments. This has to be sent back to the CSAS office by June 15th. Andry, I have mentioned it to Sebastien as we were discussing our AMP plan and he mentioned that you guys could check it together and see what is involved. My understanding is that the parts that need your input/comments (or not if all is perfect) are labelled: Aquaculture or Oceanography?. You can have a look at the parts labelled only Aquaculture to see if there is anything you could add but this might not be necessary.

Thank you
Dounia

From: Meade, James
Sent: June-01-18 2:20 PM
To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
Fisheries and Oceans Canada / Pêches et Océans Canada
80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
Tel: (709) 772-3332
Fax/ Télécopieur: (709) 772-6100
E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

Section #	Section Title	Specific Subsections	Relevant Science Section to review/ provide advice
2.4.	Project Description	2.4.1.1. 2.4.2.2.	Aquaculture Aquaculture
2.5.	Sea Cage Sites	2.5.2.	Aquaculture/ Salmonids?
2.7.	Alternatives	2.7.3.	Aquaculture
2.8.	Accidents and Malfunctions	2.8.1. 2.8.2. 2.8.3.	Aquaculture/ Salmonids
3.3.	Valued Environmental Components	3.3.2.	Salmonids
4.2.	Aquatic Existing Environment	4.2.1. 4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4 4.2.3. 4.2.4.	Aquaculture or Oceanography? Ecological Sciences Salmonids
4.8.	Data Gaps	4.8.1. 4.8.2.	Ecological Sciences Salmonids
7.0.	Effects of the Project on the Environment	7.2.	Salmonids
7.6.	Cumulative Effects	7.6.4. 7.6.5.2.	Aquaculture/ Salmonids Salmonids
7.7.	Accidents	7.7.1.	Salmonids/ Aquaculture
7.8.	Follow-up Monitoring	7.8.1. 7.8.2.	Aquaculture/ Salmonids Aquaculture/ Salmonids
7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.	Salmonids Salmonids/ Aquaculture Salmonids/ Aquaculture Salmonids/ Aquaculture
8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture

Meade, James

From: Meade, James
Sent: June-02-18 11:12 AM
To: Parrill, Erika
Subject: RE: CSAS Assessment - Greig

Hey,

Spoke to Ellen and promised her there would be some movement in next 6 weeks or so.
The Salmon SAR gone for translation, as requested.

See you Tuesday-

Cheers,
Jim

From: Parrill, Erika
Sent: June-01-18 4:40 PM
To: Meade, James
Subject: FW: CSAS Assessment - Greig

Ok. I can take the lead on this file when I return (as you just had witch and snow crab framework). ☺

Ellen was also asking about the status of the Res Doc (i.e. triploid risk assessment which Ellen and Geoff P. are authors).

I'll be back in the office on Tuesday.

I will head into the office and you can fill me in on everything I've missed! If there are no edits to the Salmon SAR, can you please send it to Lexitech for translation on Monday?

Erika Parrill
Centre for Science Advice – NL Region

s.19(1)

s.21(1)(b)

From: Meade, James
Sent: Friday, June 1, 2018 1:29 PM
To: Careen, Ellen <Ellen.Careen@dfo-mpo.gc.ca>
Cc: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>; Richards, Dale E <Dale.Richards2@dfo-mpo.gc.ca>
Subject: RE: CSAS Assessment - Greig

Hi Ellen,

I received the official request for Science Advice this morning, although I had spoken with Roger Johnson (FPP Lead) about this on Wednesday and he submitted an unsigned request as well as the sections he was requesting Science to review.

I spoke with the Section Heads of Ecological Sciences, Salmonids and Aquaculture Science yesterday and today to apprise them this would be forwarded to them for review (of appropriate sections) later today.

Our deadline to respond to FPP is June 28 and we will endeavour to complete the Science Response Process by that deadline.

Cheers,
Jim

From: Careen, Ellen
Sent: June-01-18 1:16 PM
To: Meade, James
Subject: FW: CSAS Assessment - Greig

In Erika's absence... ..

Ellen Careen

A/Senior Regional Aquaculture Management Officer
Ecosystems Management
Northwest Atlantic Fisheries Centre
St. John's NL
709-772-4908
Ellen.Careen@dfo-mpo.gc.ca



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Canada

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From: Careen, Ellen
Sent: May-31-18 3:30 PM
To: Parrill, Erika
Subject: CSAS Assessment - Greig

Erika, can you give me an update on where we are with the CSAS/ Grieg Risk Assessment ?

Ellen

Ellen Careen

A/Senior Regional Aquaculture Management Officer
Ecosystems Management
Northwest Atlantic Fisheries Centre
St. John's NL
709-772-4908
Ellen.Careen@dfo-mpo.gc.ca



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Johnson, Roger

From: Mercer, Dawn
Sent: Monday, June 4, 2018 2:22 PM
To: Turner, Kelli
Subject: FW: Grieg Aquaculture
Attachments: Request to Oceans BBP.docx

Importance: High

We can review the comments before we send them to Shawna...

From: Powell, Shawna
Sent: 2018-May-31 2:25 PM
To: Mercer, Dawn
Subject: FW: Grieg Aquaculture
Importance: High

Please review and provide comments back to me by June 22.

Thanks,
Shawna

From: Johnson, Roger
Sent: May-30-18 1:40 PM
To: Powell, Shawna
Cc: Pilgrim, Bret
Subject: Grieg Aquaculture

Please see attached request for review. If you or your staff would like to comment on sections other than those highlighted in the attached document – please feel free to do so.

If you or any of your staff have questions please feel free to contact me at anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Oceans Division advice:

Section #	Section Title	Specific Subsections
2.4.	Project Description	2.4.2.2.
3.3.	Valued Environmental Components (VECs)	3.3.4.
3.6.	Boundaries	
4.2.	Aquatic	4.2.6.
4.4.	Land and Resource Use	4.4.1. 4.4.2.
4.8.	Data Gaps	4.8.3.
7.4.	Sensitive Areas VECs	All
7.6.5.	Assessment of Significance of Residual Cumulative Effects	7.6.5.4.
7.7.	Accidents and Malfunctions	7.7.3.
7.9.	Assessment Summary and Conclusion	7.9.1.4.
8.0.	Environmental Protection	All

In particular, DFO has been requested to provide advice on:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments is June 26, 2018

Hendry, Christopher

From: Hendry, Christopher
Sent: June-04-18 2:41 PM
To: Careen, Ellen; Mallay, James G
Subject: FW: Grieg Aquaculture
Attachments: Request to Aquaculture BBP.docx

Importance: High

Hi, folks. As discussed this morning, I would like you both to take some time to review the submitted Grieg EIS document and provide any critique. I can compile our comments and provide to Roger. It is saved on the shared at the following address:

SHARED\Aquaculture Management\Grieg\EIS

Can I have your comments by the end of June? Thanks.

Chris

From: Johnson, Roger
Sent: May-30-18 2:49 PM
To: Hendry, Christopher
Cc: Pilgrim, Bret
Subject: Grieg Aquaculture

Please find attached a request for a review of the EIS for the above noted project.

If you have any questions regarding this review at this time or in the future please do not hesitate to contact me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

As the Aquaculture Division has expertise and experience in all the aspects mentioned in the EIS, it is requested that you provide input on all Sections of the EIS, supporting Component Studies and appendices that are relevant to DFO's mandate.

In particular, DFO needs to provide advice on:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined;
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments is June 26, 2018.

Martell, D John

From: Martell, D John
Sent: Monday, June 4, 2018 15:54
To: 'Cooper, Lara (IC)'
Subject: RE: Aquaculture Policy Framework and Grieg EIS Statement in NL

Hi Lara,

Good to hear from you.

Many thanks. [REDACTED]

I provided answers to your questions within the text below (red). I hope that these help. Glad to provide more information if you need it. Always a pleasure.

[REDACTED] Let me know if you need any clarification or anything else.

Take care.

J

From: Cooper, Lara (IC) <lara.cooper@canada.ca>
Sent: Monday, June 4, 2018 3:07 PM
To: Martell, D John <John.Martell@dfo-mpo.gc.ca>
Subject: Aquaculture Policy Framework and Grieg EIS Statement in NL

Hi John,

[REDACTED] I have two quick questions for you:

- Has the DFO Aquaculture Policy Framework (2002) ever been updated, or are there plans to update it? Is it still a key guidance document for aquaculture management at DFO?
No on both counts, however, we are working on the development of a policy on how DFO applied the precautionary principle to managing aquaculture which many of the same principles of the APF will be adopted in this new policy. The APF talks a lot about DFO as an enabler and a regulator which obviously has created perception issues which we would like to avoid in the future.
- Does DFO have a role to play in the assessment of the Environmental Impact Statement submitted by Grieg for the Placentia Bay site? No, the Province of Newfoundland and Labrador is responsible for this process. However, DFO is asked for advice on concerns from a fish and fish habitat protection perspective. If so, does DFO Science have a specific role in reviewing the assessment of effects on valued environmental components and the proposed mitigation measures? There was an I&T process including a risk assessment that incorporated Fed and Prov science and managers whose result was then subjected to a Rapid Science CSAS process (which DFO science heavily was the lead). This particular I&T process was exceptional for it's scale and location and for the proposed use of European origin triploids, which is well outside of the normal I&T process.

Many thanks,
Lara

s.19(1)

s.21(1)(b)

Lara Cooper

Senior Science Advisor / Conseillère scientifique principal

Office of the Chief Science Advisor / Bureau de la Conseillère scientifique en chef

Government of Canada / Gouvernement du Canada

235 Queen Street / 235, rue Queen

Ottawa ON K1A 0H5

(Mobile)

No further information has been removed or severed from this page

s.16(2)(c)

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-05-18 10:29 AM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Squires, Susan
Subject: EAC Site visit and meeting in June

Good Morning,

A couple of site visit participants have had to drop out, so the list of attendees is as follows:

Joanne
Dorothea
Blair
Jonathan
Melissa
Susan (tentative)

For those attending, I'll send around a finalized itinerary later this week, and I encourage you to book your room at the Braxton Suites.

If anyone indicated that they cannot attend, and their schedule has since changed, let me know and come on-board.

If you haven't responded to yesterday's doodle poll to schedule an EAC meeting on either June 19 or 20, please do so by the end of the work day today.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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Martell, D John

From: Hamoutene, Dounia
Sent: Tuesday, June 5, 2018 12:11
To: Martell, D John
Subject: FW: Request for advice Grieg Aquaculture
Attachments: Request for Science Advice Grieg.pdf; Request to Science BBP.docx

FYI

From: Meade, James
Sent: May-31-18 10:19 AM
To: Hamoutene, Dounia; Grant, Carole; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,
Would like to meet with you to discuss this request.
The review time would be very short (2 weeks) as this would entail a Science Response Process with a SR Report as the product, and we have been requested to deliver by June 27 (4 weeks from today!)
FYI - I have reviewed the ToC and determined the volume of the report that would require review from each of your Sections.
Please advise when you have a few minutes to spare to discuss with me - hopefully today or tomorrow.

Thanks and Cheers,
Jim

From: Johnson, Roger
Sent: May-30-18 1:33 PM
To: Meade, James
Cc: Pilgrim, Bret
Subject: Request for advice Grieg Aquaculture

Please see attached documents; one is the request form the other is the list of appropriate sections. If you or staff in your branch would like to comment on other sections please feel free to do so.

This is the informal submission to allow the start of this process while the official request is going for signature hopefully today.

If there are any questions now or during this process please feel free to direct them to me anytime. I will be discussing this with Carol the next time I see her.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

**Pages 83 to / à 86
are duplicates of
sont des duplicatas des
pages 22 to / à 25**

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-05-18 2:12 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Squires, Susan; [REDACTED]
Subject: virtual reality Aqualine -Midgard experience

Hi All,

[REDACTED] of Grieg NL just informed that the 3-D virtual reality Aqualine Midgard sea-cage system will be available for us to experience in Marystown next Tuesday, June 12, while on our site visit. So as not to exclude those who can't make the trip to Marystown, there may be an opportunity to experience the virtual reality sea-cage in St. John's, at a venue to be announced, either next Wednesday afternoon or Thursday morning, depending on interest/availability of EAC members.

Please reply to this email asap (this afternoon) to indicate if you're available to partake in this experience on Wednesday afternoon or Thursday morning next week.

Regards,

Joanne
709.729.2822

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Martell, D John

From: Martell, D John
Sent: Tuesday, June 5, 2018 14:45
To: 'Cooper, Lara (IC)'
Subject: RE: Aquaculture Policy Framework and Grieg EIS Statement in NL

Hi Lara,

Yes, very short timeline. DFO Science did already review the I&T decision regarding the importation of European origin triploid Atlantic Salmon from Stofnfiskur (Iceland) through a CSAS Special Science Response (<http://waves-vagues.dfo-mpo.gc.ca/Library/40621248.pdf>). This current review concerns a different aspect of the enterprise.

Tak ecare.

J

From: Cooper, Lara (IC) <lara.cooper@canada.ca>
Sent: Tuesday, June 5, 2018 2:20 PM
To: Martell, D John <John.Martell@dfo-mpo.gc.ca>
Subject: RE: Aquaculture Policy Framework and Grieg EIS Statement in NL

Wow. Okay. It makes sense that we would have a role to play in this review. Short timeline though.

From: Martell, D John [<mailto:John.Martell@dfo-mpo.gc.ca>]
Sent: June-05-18 2:14 PM
To: Cooper, Lara (IC)
Subject: RE: Aquaculture Policy Framework and Grieg EIS Statement in NL

Hi Lara,

One additional point. Turns out that a CSAS Science response process has been initiated by Fisheries Protection (DFO) to develop advice regarding "Review appropriate section of the Environmental Impact Statement of Placentia Bay Atlantic Salmon Aquaculture Project". The objective is for DFO to provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL. The CSAS process has a deadline of the end of this month.

Please let me know if you need anything else.

Take care.

J

From: Cooper, Lara (IC) <lara.cooper@canada.ca>
Sent: Monday, June 4, 2018 3:07 PM
To: Martell, D John <John.Martell@dfo-mpo.gc.ca>
Subject: Aquaculture Policy Framework and Grieg EIS Statement in NL

Hi John,

[REDACTED] I have two quick questions for you:

- Has the DFO Aquaculture Policy Framework (2002) ever been updated, or are there plans to update it? Is it still a key guidance document for aquaculture management at DFO?
- Does DFO have a role to play in the assessment of the Environmental Impact Statement submitted by Grieg for the Placentia Bay site? If so, does DFO Science have a specific role in reviewing the assessment of effects on valued environmental components and the proposed mitigation measures?

Many thanks,
Lara

Lara Cooper
Senior Science Advisor / Conseillère scientifique principale
Office of the Chief Science Advisor / Bureau de la Conseillère scientifique en chef
Government of Canada / Gouvernement du Canada
235 Queen Street / 235, rue Queen
Ottawa ON K1A 0H5
[REDACTED] (Mobile)

s.16(2)(c)

s.19(1)

s.21(1)(b)

Hendry, Christopher

From: Hendry, Christopher
Sent: June-05-18 2:53 PM
To: Campbell, John P.
Subject: FW: grieg update fopr AES - accurate

Latest...

- On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment. This action has initiated the start of a 50-day public review process and a review by expert departments and agencies including DFO.
- DFO have initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. DFO will also identify measures to mitigate any adverse effects.
- DFO will provide comments to the Environmental Assessment Committee who will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal Affairs and Environment by July 13, 2018
- The provincial minister of Municipal Affairs and Environment's decision on the acceptability of the EIS is due on July 31, 2018.
- The minister's recommendation to provincial Cabinet is due by August 30, 2018, and Cabinet will inform the proponent of its decision, for which there is no deadline.

Meade, James

From: Hamoutene, Dounia
Sent: June-06-18 10:55 AM
To: Meade, James
Subject: FW: Request for advice Grieg Aquaculture

FYI- Will find another way I guess!!!

From: Hendry, Christopher
Sent: June-06-18 10:54 AM
To: Hamoutene, Dounia
Subject: RE: Request for advice Grieg Aquaculture

I don't have access to a Word version, since this is how it was submitted by the proponent.

From: Hamoutene, Dounia
Sent: June-06-18 10:51 AM
To: Hendry, Christopher
Subject: FW: Request for advice Grieg Aquaculture
Importance: High

Hi Chris

Can you help with that- I have very little time to do my review and it would make it easier if I could actually manipulate the doc.

Thanks

From: Meade, James
Sent: June-06-18 10:36 AM
To: Hamoutene, Dounia
Subject: RE: Request for advice Grieg Aquaculture

Hi Dounia,

I'm In a meeting all day today and tomorrow.

Yes, the document is PDF format with little opportunity to copy and paste text; I recognize this is a real disadvantage.

Do you have access to adobe PRO? This may allow saving as a word doc.

Chris Hendry is the DFO rep on the EA Committee-you may want to contact him to see if he can get the doc converted (to MSWord) so you can manipulate it.

Let me know if/ how that works.

I can ask Erika to work on that as well.

Cheers,

Jim

From: Hamoutene, Dounia
Sent: June-06-18 10:23 AM
To: Meade, James
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim

Left a message on your answering machine regarding the document below. It is a secure document with no possibility of commenting/highlighting or copying text. I don't see how I could provide input on such a doc.

Thanks

Cheers

Dounia

From: Meade, James

Sent: June-01-18 2:20 PM

To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith

Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
Fisheries and Oceans Canada / Pêches et Océans Canada
80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
Tel: (709) 772-3332
Fax/ Télécopieur: (709) 772-6100
E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

Section	Section Title	Specific Subsections	Relevant Science Section to
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#			review/ provide advice
2.4.	Project Description	2.4.1.1. 2.4.2.2.	Aquaculture Aquaculture
2.5.	Sea Cage Sites	2.5.2.	Aquaculture/ Salmonids?
2.7.	Alternatives	2.7.3.	Aquaculture
2.8.	Accidents and Malfunctions	2.8.1. 2.8.2. 2.8.3.	Aquaculture/ Salmonids
3.3.	Valued Environmental Components	3.3.2.	Salmonids
4.2.	Aquatic Existing Environment	4.2.1. 4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4 4.2.3. 4.2.4.	Aquaculture or Oceanography? Ecological Sciences Salmonids
4.8.	Data Gaps	4.8.1. 4.8.2.	Ecological Sciences Salmonids
7.0.	Effects of the Project on the Environment	7.2.	Salmonids
7.6.	Cumulative Effects	7.6.4. 7.6.5.2.	Aquaculture/ Salmonids Salmonids
7.7.	Accidents	7.7.1.	Salmonids/ Aquaculture
7.8.	Follow-up Monitoring	7.8.1. 7.8.2.	Aquaculture/ Salmonids Aquaculture/ Salmonids
7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.	Salmonids Salmonids/ Aquaculture Salmonids/ Aquaculture Salmonids/ Aquaculture
8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture

Hamoutene, Dounia

From: Hamoutene, Dounia
Sent: June-06-18 10:56 AM
To: Richards, Dale E
Subject: RE: Request for advice Grieg Aquaculture

thanks

From: Richards, Dale E
Sent: June-06-18 12:12 PM
To: Hamoutene, Dounia
Subject: FW: Request for advice Grieg Aquaculture

Hi Dounia,
FYI...we are trying to source a solution. See below.

From: Meade, James
Sent: June-06-18 11:41 AM
To: Parrill, Erika; Johnson, Roger; Pilgrim, Bret
Cc: Richards, Dale E
Subject: RE: Request for advice Grieg Aquaculture

Roger is in RUMCC and RHOS Meetings all day.
Bret can you help??

From: Parrill, Erika
Sent: June-06-18 11:40 AM
To: Johnson, Roger
Cc: Meade, James; Richards, Dale E
Subject: FW: Request for advice Grieg Aquaculture

Hi Roger,

Do you happen to have a Word copy of the Greig EIS? I don't have Adobe Pro and need to try to get a workable copy (i.e. Word version of the EIS that you can edit via tracked changes) to a Scientist ASAP.

Chat soon,
Erika ☺

><(((°>~>>><(((°>~>>><(((°>~>>><(((°>~>>><(((°>~>>><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Meade, James
Sent: Wednesday, June 6, 2018 11:08 AM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: FW: Request for advice Grieg Aquaculture

Hi Erika,

Any chance you can access the doc (link below) and save as a Word file?
Do you have adobe Pro?
It would speed up review process for Dounia-esp given short review timeframe.
I can provide actual Sections (pages)-not the whole doc.

Thanks and Cheers,
Jim

From: Meade, James
Sent: June-01-18 2:20 PM
To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,
As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
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The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade
Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
Fisheries and Oceans Canada / Pêches et Océans Canada
80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
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E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

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8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture

Hamoutene, Dounia

From: Hamoutene, Dounia
Sent: June-06-18 11:31 AM
To: Hendry, Christopher; Richards, Dale E; Parrill, Erika; Johnson, Roger
Cc: Careen, Ellen
Subject: RE: Dropbox Link to EIS

Thank you

From: Hendry, Christopher
Sent: June-06-18 1:00 PM
To: Hamoutene, Dounia; Richards, Dale E; Parrill, Erika; Johnson, Roger
Cc: Careen, Ellen
Subject: FW: Dropbox Link to EIS

See below for an unrestricted version of the EIS. Hope this helps.

Chris

From: Sweeney, Joanne
Sent: Wednesday, May 23, 2018 3:49 PM
To: Hanchar, Dorothea <DorotheaHanchar@gov.nl.ca>; Ficzero, Vicki <vickificzero@gov.nl.ca>; Angelopoulos, John <johnangelopoulos@gov.nl.ca>; Hendry, Christopher (Christopher.Hendry@dfo-mpo.gc.ca) <Christopher.Hendry@dfo-mpo.gc.ca>; carole.grant@dfo-mpo.gc.ca; Adams, Blair <BlairAdams@gov.nl.ca>; kawaja, jonathan <jonathankawaja@gov.nl.ca>; Whelan, Dr. Daryl S <DarylSWhelelan@gov.nl.ca>; Ginn, Melissa (Melissa.Ginn@tc.gc.ca) <Melissa.Ginn@tc.gc.ca>; Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA) <Jerry.Pulchan@EC.GC.CA>; Denning, Allison (HC/SC) (allison.denning@canada.ca) <allison.denning@canada.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>
Subject: FW: Dropbox Link to EIS

Grieg has provided the link below to an "unrestricted" copy of the EIS, to assist with the review process (you can extract pages, copy, etc.). Please share this link only amongst your departmental staff for the purpose of EA review.

Joanne

Tel. (709) 729-2822

From: [REDACTED]
Sent: Wednesday, May 23, 2018 3:36 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Cc: [REDACTED]
Subject: Dropbox Link

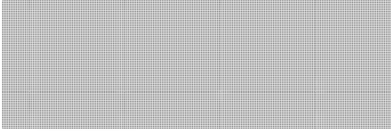
Hi Joanne,

s.19(1)

As promised here is the link to dropbox with all of the EIS information
https://www.dropbox.com/sh/4scrfrqax9chtrc/AACuoEthP_GkyB4O_kAoRrP_a?dl=0

Please let me know if you have any issues accessing the documents or with restrictions.

Thanks,



Grieg NL
P.O. Box 457
205 McGettigan Blvd.
Marystown, NL A0E 2M0

Tel: 
www.griegnl.ca



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s.19(1)

Meade, James

From: Meade, James
Sent: June-06-18 1:03 PM
To: Hamoutene, Dounia
Subject: RE: Dropbox Link to EIS

Excellent!
Assumed this was the correct path to get this done!

From: Hamoutene, Dounia
Sent: June-06-18 1:01 PM
To: Meade, James
Subject: FW: Dropbox Link to EIS

From: Hendry, Christopher
Sent: June-06-18 1:00 PM
To: Hamoutene, Dounia; Richards, Dale E; Parrill, Erika; Johnson, Roger
Cc: Careen, Ellen
Subject: FW: Dropbox Link to EIS

See below for an unrestricted version of the EIS. Hope this helps.

Chris

From: Sweeney, Joanne
Sent: Wednesday, May 23, 2018 3:49 PM
To: Hanchar, Dorothea <DorotheaHanchar@gov.nl.ca>; Ficzero, Vicki <vickificzero@gov.nl.ca>; Angelopoulos, John <johnangelopoulos@gov.nl.ca>; Hendry, Christopher (Christopher.Hendry@dfo-mpo.gc.ca) <Christopher.Hendry@dfo-mpo.gc.ca>; carole.grant@dfo-mpo.gc.ca; Adams, Blair <BlairAdams@gov.nl.ca>; kawaja, jonathan <jonathankawaja@gov.nl.ca>; Whelan, Dr. Daryl S <DarylSWhelehan@gov.nl.ca>; Ginn, Melissa (Melissa.Ginn@tc.gc.ca) <Melissa.Ginn@tc.gc.ca>; Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA) <Jerry.Pulchan@EC.GC.CA>; Denning, Allison (HC/SC) (allison.denning@canada.ca) <allison.denning@canada.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>
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Joanne

Tel. (709) 729-2822

From: [REDACTED]
Sent: Wednesday, May 23, 2018 3:36 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Cc: [REDACTED]
Subject: Dropbox Link

s.19(1)

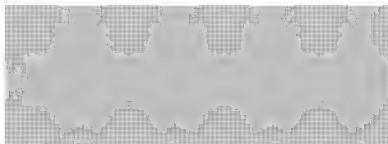
Hi Joanne,

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Thanks,



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Tel: 
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s.19(1)

Meade, James

From: Meade, James
Sent: June-06-18 1:05 PM
To: Pilgrim, Bret
Cc: Johnson, Roger
Subject: FW: Dropbox Link to EIS

No longer an issue!

Thx!

From: Hamoutene, Dounia
Sent: June-06-18 1:01 PM
To: Meade, James
Subject: FW: Dropbox Link to EIS

From: Hendry, Christopher
Sent: June-06-18 1:00 PM
To: Hamoutene, Dounia; Richards, Dale E; Parrill, Erika; Johnson, Roger
Cc: Careen, Ellen
Subject: FW: Dropbox Link to EIS

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Chris

From: Sweeney, Joanne
Sent: Wednesday, May 23, 2018 3:49 PM
To: Hanchar, Dorothea <DorotheaHanchar@gov.nl.ca>; Ficzero, Vicki <vickificzero@gov.nl.ca>; Angelopoulos, John <johnangelopoulos@gov.nl.ca>; Hendry, Christopher (Christopher.Hendry@dfo-mpo.gc.ca) <Christopher.Hendry@dfo-mpo.gc.ca>; carole.grant@dfo-mpo.gc.ca; Adams, Blair <BlairAdams@gov.nl.ca>; kawaja, jonathan <jonathankawaja@gov.nl.ca>; Whelan, Dr. Daryl S <DarylSWhelan@gov.nl.ca>; Ginn, Melissa (Melissa.Ginn@tc.gc.ca) <Melissa.Ginn@tc.gc.ca>; Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA) <Jerry.Pulchan@EC.GC.CA>; Denning, Allison (HC/SC) (allison.denning@canada.ca) <allison.denning@canada.ca>
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Joanne
Tel. (709) 729-2822

From: [REDACTED]
Sent: Wednesday, May 23, 2018 3:36 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>

s.19(1)

Cc: [REDACTED]

Subject: Dropbox Link

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s.19(1)

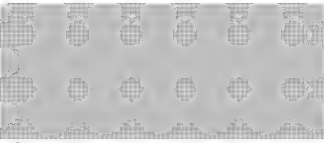
Hi Joanne,

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s.19(1)

Kelly, Jason

From: Kelly, Jason
Sent: June-08-18 7:14 AM
To: Finn, Ray
Subject: Re: your PIN

Proceeding on Grieg with other sectors including CSAS. No concerns there

Jason

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Finn, Ray
Sent: Thursday, June 7, 2018 11:15 PM
To: Kelly, Jason
Subject: your PIN

Further to your PIN – all good on Greig ??

CSAS proceeding etc ?

Ray Finn
Regional Director / Directeur régional
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada / Pêches et Océans Canada
PO Box 5667 / CP 5667
St. John's NL A1C 5X1 / St. John's T. N.-L. A1C 5X1
Tel | Tél : (709) 772 2442
Fax / Tél : (709) 772 7862

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-08-18 11:09 AM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: [REDACTED]
Subject: Squires, Susan
Virtual Reality Sea-Cage experience

Good Morning,

As you know, Grieg NL will be providing a virtual reality sea-cage experience on Thursday morning, June 14 at the Homeport Hotel in St. John's. The event will take place in the Lighthouse Boardroom of the hotel (formerly one of the Hillview Terrace Buildings) from 9-10am, for EAC members who are available to don 3-D glasses and experience life in a sea-cage. The address is 3 Wadland Crescent, and you enter the building at the Reception entrance. You can visit the Homeport Hotel web site at the following link: <https://homeporthotel.com/location/> .

So far, Susan, Carole and Vicki have indicated their availability to participate, and all EAC members are welcome to attend from 9-10am on June 14, 2-18.

Feel free to let [REDACTED] know if you plan to attend.

Regards,

Joanne

Joanne
709.729.2822

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s.19(1)

Meade, James

From: Meade, James
Sent: June-12-18 8:18 AM
To: Hamoutene, Dounia
Subject: RE: Request for advice Grieg Aquaculture

Thanks Dounia,

Will drop down after that (11'ish) if you are available and we can discuss the report/ comments and I'll likely use a stick to get a copy.

Cheers,
Jim

From: Hamoutene, Dounia
Sent: June-11-18 9:05 AM
To: Meade, James
Subject: RE: Request for advice Grieg Aquaculture

Cheers

From: Meade, James
Sent: June-11-18 9:04 AM
To: Hamoutene, Dounia
Subject: RE: Request for advice Grieg Aquaculture

Hi Dounia,

Will touch base tomorrow.

Cheers,
Jim

From: Hamoutene, Dounia
Sent: June-11-18 8:56 AM
To: Meade, James
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim

Let me know how I can share it with you. You actually don't have the doc as of now (too big to send by email)
Hope all is well
Dounia

From: Meade, James
Sent: June-09-18 9:11 AM
To: Hamoutene, Dounia
Cc: Ratsimandresy, Andry; Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

s.19(1)

Hi Dounia,

Thanks for this - your review, and quick turnaround are greatly appreciated!

I plan to go through your comments today and tomorrow and hope to be in touch very early in the week should I have any questions.

Cheers,

Jim

From: Hamoutene, Dounia

Sent: June-07-18 2:45 PM

To: Meade, James

Cc: Ratsimandresy, Andry; Donnet, Sebastien G

Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

Unfortunately I do not have time to spend in more than a quick review of the document (which is considering the size of the docs easier said than done). I have made a few comments in the main text and you have to indicate to me how I can share it with you. I have limited my comments to the benthic deposition aspects of the project although I could contribute to the farmed-wild interactions (not only salmon-salmon) as well I have limited the scope of my advice in light of the little time I have. In addition, Carole and her staff will provide ample information on wild salmonids and Keith and his crew on EBSAs and other ecosystem considerations. Considering the significant number of COSEWIC and/or SARA listed species I would suggest sending this to Mark Simpson as well for his input. Find below my responses to the main questions as per the scope cited above.

I have highlighted in yellow parts that will require Andry and Sebastien's comments/advice (Andry, Sebastien, see also highlighted parts in annex attached).

Regards,

Dounia

From: Meade, James

Sent: June-01-18 2:20 PM

To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith

Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

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DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects: The methodologies followed regarding baseline assessments in term of AAR requirements followed the guidelines. I have highlighted a few points in the environmental study (LGL 2018b) that I will share with Andry and Sebastien for their expert opinion. This has to do with the appropriateness of the current data collected (i.e. representability of overall oceanographic

conditions) for an adequate modelling of deposition through DEPOMOD. Their comments are more informed than mine and should be important within that context. I have one concern regarding low DO in the Rushoon BMA (especially that the low DO was collected at 3 meters) in the table attached (word). Considering the lower documented tolerance of triploids to hypoxia, size of fish, important stocking numbers etc this would be a risk that might require attention in term of mortality potential of salmon in the summer. This environmental risk might require additional comments from the proponent.

- **The mitigation measures proposed by the proponent:** Mitigation measures described by the proponent are fairly standard similarly as the evaluation of environmental risks (pertaining to the following point). The knowledge gaps in term of chemical dispersion/accumulation in hard-bottom dominated cold environments preclude further comments considering the absence of data and/or predictions. Environmental cumulative effects could be further assessed (see my comments in the document) by adding a few sampling points between BMAs though limitations in access might be an issue (depths) and are not required through DFO established regulatory processes but could be considered.
- **The level of certainty in the conclusions reached by the proponent on the effects:** similarly to my previous points, conclusions in term of cumulative effects are hard to make and any text related to that would be speculative. Regarding benthic effects at the site level they are in agreement with actual knowledge of the area. I will let Andry and Sebastien bring further perspective on DEPOMOD predictions and subsequent conclusions.
- **The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);** as per the AAR methodologies, techniques are adequate for baseline assessments however considering when cage will be stocked (a few years) and timing of surveys I would refer to the RAMO representative (Chris Hendry) to inform on guidelines for baseline data acquisition timing/validity.
- **The follow-up program proposed by the proponent;** (see above note on in between BMAs point sampling surveys)
- **Whether additional information is required from the proponent to complete the review.** (see points above + a few comments in the document)

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

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Section #	Section Title	Specific Subsections	Relevant Science Section to review/ provide advice
2.4.	Project Description	2.4.1.1. 2.4.2.2.	Aquaculture Aquaculture
2.5.	Sea Cage Sites	2.5.2.	Aquaculture/ Salmonids?
2.7.	Alternatives	2.7.3.	Aquaculture

2.8.	Accidents and Malfunctions	2.8.1. 2.8.2. 2.8.3.	Aquaculture/ Salmonids
3.3.	Valued Environmental Components	3.3.2.	Salmonids
4.2.	Aquatic Existing Environment	4.2.1. 4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4 4.2.3. 4.2.4.	Aquaculture or Oceanography? Ecological Sciences Salmonids
4.8.	Data Gaps	4.8.1. 4.8.2.	Ecological Sciences Salmonids
7.0.	Effects of the Project on the Environment	7.2.	Salmonids
7.6.	Cumulative Effects	7.6.4. 7.6.5.2.	Aquaculture/ Salmonids Salmonids
7.7.	Accidents	7.7.1.	Salmonids/ Aquaculture
7.8.	Follow-up Monitoring	7.8.1. 7.8.2.	Aquaculture/ Salmonids Aquaculture/ Salmonids
7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.	Salmonids Salmonids/ Aquaculture Salmonids/ Aquaculture Salmonids/ Aquaculture
8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture

Richards, Dale E

De: Richards, Dale E
Envoyé: June-14-18 9:58 AM
À: McCallum, Barry
Objet: Re: Grieg Science Response

Carole has committed to having comments on the EIS to CSA on Tuesday (19th) by COB, that will permit a CSAS meeting on the following Monday afternoon (25th). The comments from Salmonids will not be in the format we requested but Carole will make herself available to us in the event there are questions. Comments from Aquaculture and ES can be incorporated in the interim. I am also bring Erika in on the file to assist Jim with the coordination part of CSAS file and making OT available to draft the response, if required. FPP will be participating in the meeting and as such will be privy to the draft response. Thus, although we 'may' miss the FPP deadline by a day or two with the submission of our 'final RDS approved' report, FPP will be able to commence to draft the Regional response based on the draft SRR and the concerns expressed in the meeting. I will stay in close communication with FPP throughout the process. Although not the preferred route, risk managing the deadlines with the urgent provision of advice on these sorts of requests is not new for us. Given the profile of the Grieg file, we have to ensure that the inputs going into the advisory document and CSAS meeting are soild. Thus, giving Salmonids the time needed, within reason.

If you need to discuss further we can talk this afternoon.

Dale

De : McCallum, Barry
Envoyé : Thursday, June 14, 2018 09:01 AM
À : Richards, Dale E
Objet : RE: Grieg Science Response

And what does that look like?

From: Richards, Dale E
Sent: Wednesday, June 13, 2018 5:12 PM
To: McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>
Subject: Grieg Science Response

Hi Barry,

I have spoken with Carole and Ben and we have a path forward on the Grieg Aquaculture Science Response. I am in my office, if you need to drop by following the meeting in the Dunne.

Dale

E. Dale Richards, B.Sc. Hons., M.Sc.
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Richards, Dale E

De: Mansour, Atef A H
Envoyé: June-13-18 10:25 AM
À: Clarke, Keith
Cc: Richards, Dale E
Objet: Craieg Aquaculture

Hi Keith,

Dale asked yesterday during the round table to send a reminder that the input for the Craieg Aquaculture review deadline is Friday in order to have the Science advice ready for Ecosystem Management. Please follow up with the subject matter experts to ensure meeting the deadline.

Thanks,
Atef

Dr. Atef A.H. Mansour

Division Manager, Environmental Sciences Division
Newfoundland and Labrador Region
Fisheries and Oceans Canada / Government of Canada
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Gestionnaire de division, Division des sciences environnementales
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atef.mansour@dfo-mpo.gc.ca / Tél. : 709-772-4133



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of Canada

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du Canada

Canada

Meade, James

From: Richards, Dale E
Sent: June-13-18 11:09 AM
To: Davis, Ben
Cc: Meade, James
Subject: FW: Request for advice Grieg Aquaculture

Hi Ben,

As mentioned yesterday during round table, input to the Grieg Aquaculture EIS request is due with the CSA Office on Friday – the 14th. It is imperative that CSA receive comments by Friday as we have little time to draft the SRR prior to the meeting and response to FPP. To date, CSA has received input from Dounia and Jim will be reaching out separately to Sebastien/ Andry on the oceanography bits required. However, if you could flag the priority of this request with Salmonids, it would be appreciated. The original e-mail request is below.

Also, I will be in my office this afternoon, if you are available to discuss the other items you mentioned yesterday.

Thanks,
Dale

From: Meade, James
Sent: June-01-18 2:20 PM
To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

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7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.	Salmonids Salmonids/ Aquaculture Salmonids/ Aquaculture Salmonids/ Aquaculture
8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic</i>		Salmonids/ Aquaculture

<i>Salmon + Appendices</i>	
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Richards, Dale E

De: Grant, Carole
Envoyé: June-13-18 5:35 PM
À: Richards, Dale E
Objet: Re: Grieg Request -

No worries Dale. I spoke to Barry after we chatted and suggested Tues for comments. Ian and Brian are both agreeable with this date as well. Not sure if it'll be in the exact format Jim requested as it will more likely be general comments, but based on the comments I'm hoping it can be easily incorporated into SSR. I'll make sure at least one of us is available if Jim or Erika has any questions as they go through our comments.

I'm also available the following Monday (June 25) for a meeting. Would we also need Ian and Brian's participation at this meeting?

Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Richards, Dale E
Sent: Wednesday, June 13, 2018 5:06 PM
To: Grant, Carole
Subject: Grieg Request -

Hi Carole,
Sorry I couldn't take your call this afternoon. I saw your number on the phone but I was in a meeting. I will be my office again late Thursday afternoon if you need to call. I spoke with Ben and Jim briefly this afternoon regarding the Grieg request and I believe we have a plan forward. I am hoping that Salmonids can have comments to CSA by COB on Tuesday -19th? Might that be okay? I plan to bring Erika in the EIS file too and hope that will assist with expediting the draft SRR and coordination of the file within the CSA Office. I will also discuss a 2-3 day delay with FPP. The earliest we could do a CSAS meeting to review the draft report would be Monday (25th) afternoon (TBC based on people's availability).

We can talk tomorrow.

Dale

E. Dale Richards, B.Sc. Hons., M.Sc.

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Ecosystems and
Oceans Science

Sciences des écosystèmes
et des océans

Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that DFO Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment website at the following link:

<http://www.mae.gov.nl.ca/env-assessment/projects/Y2016/1834/index.html>

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 – Project Rationale
 - Section 2.4.3 – Land-based Facility (RAS hatchery)
 - Section 2.4.4 – Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 – Physical Environment
 - Section 4.2.3 – Fish and Fish Habitat
 - Section 4.2.4 – Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat VEC Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 – Wild Salmon VEC
 - Section 7.9.2 – Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret, likely due to the experience of the proponent with this type of project. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties, ~~associated with the proposed activities~~. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation.

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics/-routes. Additional information is required on mitigation measures for biosecurity risks and invasive species. This seems contrary to the purpose of creating BMAs.

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Commented [PE1]: Erika to follow-up with Sebastien regarding gear, SOPs for others in area

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by an remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. What frequency will the ROV monitor the cages (e.g. monthly monitoring, ROV to be shared between BMAs)? Daily?

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Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee felt it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1989). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information/-estimate.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Please confirm/-clarify.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 11. The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay. Although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US market, notwithstanding the potential impacts it could have on local fisheries resources, particularly Atlantic Salmon.

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased

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Commented [PE2]: Triploids are not widely used in Norway
Introgression is #1 threat in Norway

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

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Page 14. "Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon." This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: "In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay" is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia). The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reconsidered.

Commented [PE3]: Not in reference list

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Tlusty. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

Commented [PE4]: Not in reference list

Page 16. "Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern." As stated previously, this may not apply to all BMAs.

Commented [PE5]: Concern because of baseline data and should be reviewed during NL site licensing process

Page 17. The Executive Summary (p. xxxix) states that "triploid female salmon do not enter freshwater", however, it states here that "the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes." Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 - Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used, ~~yet~~.

Page 45. It states that Greig-Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts wouldn't be recommended in areas of hypoxia due to

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Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. "Typically once a year, Greig-Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..." This would imply that all nets are replaced approximately every year. Please revisit and confirm and explain why once a year.

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Page 64. "If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats." Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Greig NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? There should also be some discussion regarding the transfer of pathogens/disease from lumpfish to salmon.

The stock origin of the lumpfish (cleaner fish) is not clear. ~~Also, the density of lumpfish (i.e., 16,000 per cage) appears very high.~~ This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. "Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated." These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. ~~While it is assumed that Grieg staff are experienced in this process, examples of past successful transfers and rates of accident/losses would also be useful in this context.~~

Commented [PE6]: Comparison with SOPs

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Page 76. "The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination." It is unclear how this will be achieved as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

as pathogens could be present in a given BMA and then transmitted to another BMA. The proposed logistics seem contrary to the purpose of creating BMAs. Relatedly, on page 98: "Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Fort or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." However, they will use the routes crossing BMAs, as shown in Figure 2.53, thereby not really mitigating risk of cross-contamination.

Commented [PE7]: Compare with section in Exec Summary

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that 'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...' Please revisit and clarify for consistency.

Page-92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites", exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Commented [PE8]: Not really recommendation – DFO Science stated this in triploidy Science Response (p.g 9).

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: "In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality" is misleading unclear as only one intense winter could be problematic. A recent example is the wintersuperchill event in 2014 which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past

Commented [PE9]: Is this risk to individual fish or environmental risk?

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland shelf) region?

Page 100. "A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Commented [PE10]: Do we have a reference?

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment is lacking in detail and seems overly optimistic that there would be little to no problems. The "assessment" is thin.

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Section 3.0 – Effects Assessment Methodology

Page 128. Economy, Training, Employment and Business is not a "VEC" in the conventional context of an EIS. This information is acceptable from an economics context, but it does not belong in the ecological portions of the report. This pattern is repeated at several points in the document in Sections 3, 4, & 7.

Page 130. Project Area. The Marine Industrial Park may have runoff from the facilities located there under some scenarios, with a potential for runoff into the marine environment. However, there is no mention or evaluation of the potential for this outcome. It is difficult to believe the probability of this scenario is zero, as the wording in the text implies.

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 130. Study Area. It states that *"The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA"* and that *"This is considered the maximum extent wherein there is potential for effects of the Project to occur..."* Although the EA Committee felt it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

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Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Commented [PE12]: Need to reword as potential for wild salmon to be impacted outside study area. Proponent shouldn't say "maximum extent" as it gives impression effects will ONLY happen within study area. We have evidence to suggest impact may happen outside study area as salmon do leave PB and may interact with wild salmon.

Even if fish don't escape, could send disease to other salmon from Mar, Giff, etc as they do enter the Bay. Need to get reference from Ian.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Location of Rivers. The document states that *"...the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site"*, whereas earlier in the EIS (p. 96) it states that *"the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* Please revisit and clarify for consistency.

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled over the years, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

modeling of the area, published by Ma et al. (2012) is not even referenced. Appendix D (Fish and Fish Habitat Component Study) states: "Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important." This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. Using tides only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle) but a longer time-series is necessary to be representative. Wind forcing and the Labrador Current are variable on a timescale of days to seasons; again implying the need for long time-series. Consequently, the data collected for this study and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

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Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. -not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/ or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

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Page 145. Flood and Tidal Zones. "During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights." A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources (e.g. xxx). For example: <http://navigator.oceansdata.ca/public/>

Commented [PE14]: Follow up with Sebastien

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability would be helpful and should be provided in these figures.

Commented [PE15]: How do we cite this?

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around

Commented [PE16]: Get reference from Cynthia

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;

2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where ~~this data is~~ these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this is already known from studies performed in Placentia Bay (see Matheson et al. 2016). The evidence for this is rather conclusive and well documented, and the supporting paper has been published for two years. [The proponent should not cite "pers. comm." sources when published accounts from the area are readily available.

Additionally, why present information about eelgrass restoration only? Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014).

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is ~~considered as a concern or not~~.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. ~~It would be helpful if h~~ Habitat should be ~~was~~ discussed at a larger spatial scale using existing information (see XXX).

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three ~~(3)~~ generations. The authors of the COSEWIC report also ~~clearly~~ indicated that with respect to ~~s~~South Newfoundland, had the analysis extended back just one ~~(4)~~ single year (i.e.: over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in ~~Newfoundland and Labrador NL~~. A retrospective analysis of salmon returns to Conne River for the years 1976—1985 (10—year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4—four years of the fish counting fence operation (1986—1989) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided ~~here~~.

Commented [PE17]: Proponent needs to clarify. Need to reword with Kate

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Commented [PE18]: Follow up with Aquaculture Section re. references if we need to obtain more data outside of 100 m (100 m was decided based on DFO Science previous suggestions on footprint).

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least ~~one year or more~~ two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al., 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion is ~~weak~~ requires more discussion and ~~is~~ missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps ~~regarding cumulative effects are also significant~~ regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged and addressed. Water structure seasonality (i.e.: temperature and salinity) are also data gaps that still need to be addressed, particularly salinity.

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Commented [PE19]: Main issues: #1 – ocean currents; #2 – salinity

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.

Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification." The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; how is the term "adequate" defined in this context?

Page 352. Algal Blooms. This section of document cites DFO 2010c many times (almost the only reference and the source of the Harmful Algal Bloom (HAB) map). This is not included in the references and the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. The information appears to be correct, although likely a little underestimated, as the finfish aquaculture industry on the south coast considers HABs a concern, and it is certainly a major issue in BC-British Columbia with increasing concern in the NL Region.

The document refers to the potential for toxic algal blooms but states that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, Greig salmon farms in British Columbia recently lost 250,000 salmon owing to toxic algae.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, simply lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant (NS), yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "NS not significant".

Commented [PE20]: Not in reference list

Is this the correct reference?

LGL. 2018. Wild Atlantic Salmon. Component Study for the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project. LGL Rep. FA0144-1. Rep. by LGL Limited, St. John's, NL for Grieg NL, Marystown, NL. 71 p. + appendix.

Commented [PE21]: Can be found in following references: xxx

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Commented [PE22]: Get new wording from Sebastien

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Commented [PE23]: Despite concern in BC and other areas in the world – increasing concern due to trend ... but has not yet been seen to date in NL.

Main point is that there is increasing concern.

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. entirely too short) the estimated benthic loading of carbon provided in this section ~~cannot really be trusted~~ may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. "It is important to consider all of these visual indicators when assessing for impacts of aquaculture since *Beggiatoa* mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)." They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.

Page 364. "Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles." As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO AAR (Aquaculture Activities Regulations) (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Commented [PE24]: Monitoring isn't a mitigation measure (feeds into compliance).

Explain how usage of tools will demonstrate the issue and then what mitigation measures they would take to address issue (e.g. follow AAR rules)

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: "Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit." It would be useful for the reader if these other attributes were described. It also states that "since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

salmon and wild Newfoundland salmon." There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. [~~Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.~~] This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc... The document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may ~~simply~~ have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Commented [PE25]: Ian to send reference

Page 435. In the statement "~~it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon~~" the word 'sometimes' should be ~~replaced with~~ ~~'commonly-deleted'~~.

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that "~~even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence~~", ~~yet nonetheless~~ escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that "~~smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks.~~" It is important to point out that ~~a lot many~~ of the salmon rivers on the south coast of Newfoundland ~~are small and~~ have low abundances.

Page 436. [~~The authors seem to be mixing up juvenile and adult surveys.~~] Also "~~older individuals~~" is not correct; these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in ~~the fall 2017 surveys~~ either. Interestingly, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Commented [PE26]: Reword and say that Proponent needs to clarify

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Page 439. There ~~is a~~ statement: "~~...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon.~~" ~~is an overstatement.~~ Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

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Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) ~~would not have a significant impact on wild salmon,~~ yet the level of confidence associated with this prediction is ~~medium~~.

Commented [PE27]: Yes it would have a large effect (e.g. only 20,000 wild salmon on south coast and a 160,000 escape of farmed fish would have a significant effect).

e.g. highly unlikely that an escape of this magnitude would not have a large effect

their confidence level is incorrect

Commented [PE28]: Shouldn't this be higher?

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

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Page 476. Accidental Events. ~~Again,~~ Sampling would involve collecting and analyzing blood samples. ~~Many~~ monitoring of impacts would likely be undertaken by DFO in collaboration with Greig Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the ~~WS-wild salmon~~ VEC were predicted to be not significant". While the proponent has outlined in detail the various mitigation measures that will be implemented, many of which are to be commended, a more realistic conclusion could be: Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Commented [PE29]: What was in EA guidelines regarding requirement to collect baseline data?

Need longer time-series to determine how effective Proponent's deposition modelling is.

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~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

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~~There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.~~

Commented [PE30]: We're making conclusions on the Project and the aquaculture industry and not the EA itself. Need to ensure we are not making wide sweeping statements and stick to scope

Revision to para 1: Proponent can't say non-significant effect due to data and reasons stated above.

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7.9.2 Accidents and Malfunctions

Page 480. It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it would be low.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect 'alter genetic integrity....' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Commented [PE31]: Suggest now including Gamish 2017 returns. (which should be published in SAR this week).

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never

Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are ~~multi-sea winter salmon~~ (MSW).

Page 5. It states that "Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit." It would be useful if these other attributes were described. It also states that "since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon." There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of ~~our~~ the Department's counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents and this information should be reported and discussed in the EIS.

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that "the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages" and that this could affect migration patterns if wild salmon "choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey". This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data ~~is~~are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful ~~mainly because a recapture plan wasn't in place due to operational and environmental issues~~ which resulted in delays in initiating recapture efforts.

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Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from ~~Salmonid DFO~~ Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: "*siting of sea cages at locations with suitable currents and depth to distribute organic waste*", which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Greig-Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it a one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Page 8. The basis for using 1,124 kg/cage/day feed input is not clear. Is it the maximum load (worst case scenario as requested by AAR) or something else?

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e., prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. "*The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track.*" The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 36. "In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay." A reference should be provided here and where other such statements are made. For example the statement that follows: "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."

Page 36. "Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters." This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (pg. 5) states: "There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."

Page 36. Please provide references for the datasets that have already been documented (e.g. MUN Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. "At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m." It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference, Mooring name?). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Conclusions

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- The ocean current time-series used for this study are too short to give statistically robust/satisfactory estimates of dispersion.

Commented [PE32]: Not in reference list

Are these the correct references:

Hart, S.R., Blusztajn, J., Dick, H.J.B., Meyer, P.S. and Muehlenbachs, K. (1999). The fingerprint of seawater circulation in a 500-meter section of ocean crust gabbros. *Geochimica et Cosmochimica Acta* 63: 4,059-4,080 with this as hyperlink: https://earthref.org/ERR/n:19_b_aaaa0000019tab09/

Schillinger, D.J., DeYoung, B., and J. Foley. 2000. CTD data from the Newfoundland coast: 1986 and 1987. *Dept. Physics and Physical Oceanography, Memorial University*. 31 p.

Commented [PE33]: Change "misleading" to "inaccurate"

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate and misleading statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. This is unlikely. The data does not support this conclusion.

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The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each BMA site) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the proponent;

- As the ~~Environmental Effects Monitoring and Follow-up Program~~ (EEMP) has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Griseig NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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Newfoundland and Labrador Region **Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.**

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Approved by

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Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

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Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

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Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Verspoor, E., McGinnity, P., Bradbury, I., and Glebe, B. 2015. The potential direct and indirect genetic consequences for native Newfoundland Atlantic Salmon from interbreeding with European-origin farm escapes. DFO Can. Sci. Advis. Sec. Res. Doc. 2015/030. viii + 36 p.

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DRAFT

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

This Report is Available from the

Center for Science Advice (CSA)
Newfoundland and Labrador Region
Fisheries and Oceans Canada
PO Box 5667
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Aussi disponible en français :

*MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page
couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.*

Meade, James

From: Hamoutene, Dounia
Sent: June-14-18 10:46 AM
To: Meade, James
Subject: RE: Request for advice Grieg Aquaculture
Attachments: AEI Joost 2016.pdf

Hi Jim
Here is the paper as requested- It is listed as a reference in the Grieg report if I am not mistaken
Thanks
Dounia

From: Meade, James
Sent: June-14-18 10:19 AM
To: Hamoutene, Dounia
Subject: RE: Request for advice Grieg Aquaculture

Hi Dounia,
Thanks for your review and comments. I have them compiled in the attached doc.
Just want to ensure I have captured everything.
Small note: I will need a ref for Verhoeven et al. You cited in your review.

Thanks and Cheers,
Jim

From: Hamoutene, Dounia
Sent: June-07-18 2:45 PM
To: Meade, James
Cc: Ratsimandresy, Andry; Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,
Unfortunately I do not have time to spend in more than a quick review of the document (which is considering the size of the docs easier said than done). I have made a few comments in the main text and you have to indicate to me how I can share it with you. I have limited my comments to the benthic deposition aspects of the project although I could contribute to the farmed-wild interactions (not only salmon-salmon) as well I have limited the scope of my advice in light of the little time I have. In addition, Carole and her staff will provide ample information on wild salmonids and Keith and his crew on EBSAs and other ecosystem considerations. Considering the significant number of COSEWIC and/or SARA listed species I would suggest sending this to Mark Simpson as well for his input. Find below my responses to the main questions as per the scope cited above.
I have highlighted in yellow parts that will require Andry and Sebastien's comments/advice (Andry, Sebastien, see also highlighted parts in annex attached).

Regards,
Dounia

From: Meade, James
Sent: June-01-18 2:20 PM

To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- **The sufficiency of baseline data and appropriateness of methodologies to predict effects:** The methodologies followed regarding baseline assessments in term of AAR requirements followed the guidelines. I have highlighted a few points in the environmental study (LGL 2018b) that I will share with Andry and Sebastien for their expert opinion. This has to do with the appropriateness of the current data collected (i.e. representability of overall oceanographic conditions) for an adequate modelling of deposition through DEPOMOD. Their comments are more informed than mine and should be important within that context. I have one concern regarding low DO in the Rushoon BMA (especially that the low DO was collected at 3 meters) in the table attached (word). Considering the lower documented tolerance of triploids to hypoxia, size of fish, important stocking numbers etc this would be a risk that might require attention in term of mortality potential of salmon in the summer. This environmental risk might require additional comments from the proponent.
- **The mitigation measures proposed by the proponent:** Mitigation measures described by the proponent are fairly standard similarly as the evaluation of environmental risks (pertaining to the following point). The knowledge gaps in term of chemical dispersion/accumulation in hard-bottom dominated cold environments preclude further comments considering the absence of data and/or predictions. Environmental cumulative effects could be further assessed (see my comments in the document) by adding a few sampling points between BMAs though limitations in access might be an issue (depths) and are not required through DFO established regulatory processes but could be considered.
- **The level of certainty in the conclusions reached by the proponent on the effects:** similarly to my previous points, conclusions in term of cumulative effects are hard to make and any text related to that would be speculative. Regarding benthic effects at the site level they are in agreement with actual knowledge of the area. I will let Andry and Sebastien bring further perspective on DEPOMOD predictions and subsequent conclusions.
- **The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);** as per the AAR methodologies, techniques are adequate for baseline assessments however considering when cage will be stocked (a few years) and timing of surveys I would refer to the RAMO representative (Chris Hendry) to inform on guidelines for baseline data acquisition timing/validity.
- **The follow-up program proposed by the proponent;** (see above note on in between BMAs point sampling surveys)
- **Whether additional information is required from the proponent to complete the review.** (see points above + a few comments in the document)

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,

Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques
 Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
 Fisheries and Oceans Canada / Pêches et Océans Canada
 80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
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 E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

Section #	Section Title	Specific Subsections	Relevant Science Section to review/ provide advice
2.4.	Project Description	2.4.1.1. 2.4.2.2.	Aquaculture Aquaculture
2.5.	Sea Cage Sites	2.5.2.	Aquaculture/ Salmonids?
2.7.	Alternatives	2.7.3.	Aquaculture
2.8.	Accidents and Malfunctions	2.8.1. 2.8.2. 2.8.3.	Aquaculture/ Salmonids
3.3.	Valued Environmental Components	3.3.2.	Salmonids
4.2.	Aquatic Existing Environment	4.2.1. 4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4 4.2.3. 4.2.4.	Aquaculture or Oceanography? Ecological Sciences Salmonids
4.8.	Data Gaps	4.8.1. 4.8.2.	Ecological Sciences Salmonids
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7.8.	Follow-up Monitoring	7.8.1. 7.8.2.	Aquaculture/ Salmonids Aquaculture/ Salmonids
7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.	Salmonids Salmonids/ Aquaculture Salmonids/ Aquaculture Salmonids/ Aquaculture
8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture



Bacterial community composition of flocculent matter under a salmonid aquaculture site in Newfoundland, Canada

Joost T. P. Verhoeven¹, Flora Salvo², Dounia Hamoutene², Suzanne C. Dufour^{1,*}

¹Department of Biology, Memorial University of Newfoundland, St. John's, NL A1B 3X9, Canada

²Science Branch, Fisheries and Oceans Canada, PO Box 5667, St. John's, NL A1C 5X1, Canada

ABSTRACT: Aquaculture has become a rapidly growing industry: over the past 3 decades, commercial production has steadily increased, and further expansion seems likely. However, the rise of aquaculture has been accompanied by concerns, especially regarding environmental sustainability. Substrates located under aquaculture sites receive large influxes of organic matter that can subsequently create anoxic conditions and thereby impact existing benthic communities. Shifts in the relative abundance of specific groups of bacteria could prove to be important indicators of impact and remediation. Here, we investigated bacterial community composition via 16S rRNA gene sequencing on isolated DNA from flocculent matter samples and associated bacterial mats under a hard-bottom aquaculture site in Newfoundland, Canada. We describe the heterogeneous community present in the flocculent matter, characterized by high relative abundances of the genera *Spirochaeta* (12%), *Prolixibacter* (5.6%) and *Marinifilum* (4.6%). Bacterial mats were not composed of *Beggiatoa* as often hypothesized, but instead were dominated by the genera *Spirochaeta* (15%), *Prevotella* (21%), *Meniscus* (11%) and *Odoribacter* (20%). Our findings provide insights into the bacterial composition of flocculent matter deposited on hard substrates and undergoing degradation, and point to 3 unexpected bacterial genera as potential indicators of organic enrichment.

KEY WORDS: Microbiome · Organic enrichment · Bacterial mats · *Spirochaeta* · *Prolixibacter* · *Marinifilum*

INTRODUCTION

In recent years, the aquaculture industry has experienced rapid growth worldwide (Asche et al. 2008), substantiating the hypothesis that aquaculture could soon produce more than half of the seafood consumed globally (Costa-Pierce 2010). Marine aquaculture operations in coastal Newfoundland (NL), Canada, notably the cage culture of salmonids and long-line mussel culture, have seen significant growth in the last decade (Anderson et al. 2005, Fisheries and Oceans Canada 2016).

Along with the increase in finfish aquaculture sites (or 'farms'), concerns regarding ecological impacts

and sustainability have arisen (Jusup et al. 2009). One major environmental concern is the increased deposition of organic matter in the benthic environment, which usually occurs in the form of a complex mixture known as flocculent matter composed of decomposing fish-food pellets, microbes, fish faeces and other organic matter (Salvo et al. 2015). The accumulation of organic matter on the seafloor can drive an increase in oxygen consumption by environmental or fish faeces-associated micro-organisms (Tett 2008). The resulting hypoxic conditions can negatively, and potentially permanently, affect the benthic in- and epifauna (Karakassis et al. 2000, Jusup et al. 2009, Pochon et al. 2015).

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Publisher: Inter-Research · www.int-res.com

*Corresponding author: sdufour@mun.ca

**Pages 148 to / à 156
are withheld pursuant to section
sont retenues en vertu de l'article**

68(a)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Kelly, Jason

From: Kelly, Jason
Sent: June-14-18 1:05 PM
To: Pike, Kelly J; Dalton, Charlene
Subject: FW: Grieg Update to RDG

Charlene, can you set up a briefing for myself and Ray with the RDG office for June 29 on the Grieg EA

Thanks Jason

From: Finn, Ray
Sent: June-14-18 12:58 PM
To: Kelly, Jason
Subject: Re: Grieg Update to RDG

Looks good right now. Follow up with Charlene pls. She is back filing for Kelly for a few days

Thanks a lot Jason.

Ray

(cell)
(709) 772 - 2442. (office)

Sent via Blackberry

From: Kelly, Jason
Sent: Thursday, June 14, 2018 12:55 PM
To: Finn, Ray
Cc: Johnson, Roger
Subject: Grieg Update to RDG

Ray, just following on our conversation concerning Grieg and updating Jackie. In addition to the regular written weekly updates we do, we could provide Jackie a with a F2F update around **June 29**. At that point we should have received comments from all sectors and had a chance to go through them. Work for you??? If so I'll have Kelly set it up

Jason

Jason Kelly

A/ Manager – Regulatory Review
Fisheries Protection Program, Ecosystems Management Branch
Fisheries and Oceans Canada, Government of Canada
P.O. Box 5667, St. John's, NL A1C 5X1
Ph: (709) 772-4126
Email: jason.kelly@dfo-mpo.gc.ca

s.16(2)(c)

s.19(1)

Meade, James

From: Richards, Dale E
Sent: June-14-18 3:08 PM
To: Parrill, Erika; Meade, James
Cc: Korchoski, Connie
Subject: FW: CSAS Meeting

I have tentatively booked the Memorial Room, for the Grieg Aquaculture request.

-----Original Appointment-----

From: DFO CONF St.Johns-80EastWhiteHillsRd-1-Memorial CONF MPO
Sent: June-14-18 3:05 PM
To: Richards, Dale E
Subject: Tentative:CSAS Meeting
When: June-25-18 12:00 AM to June-26-18 12:00 AM (UTC-03:30) Newfoundland.
Where: DFO CONF St.Johns-80EastWhiteHillsRd-1-Memorial CONF MPO

Dalley, Kate L

From: Dalley, Kate L
Sent: June 15, 2018 1:20 PM
To: Clarke, Keith; Meade, James
Subject: RE: Request for advice Grieg Aquaculture
Attachments: Memo EIS Grieg NL Science Input - Dalley.doc

Hi Jim,

You will find my input on the Grieg EIS attached. Any questions, let me know.

Kd

Kate L. Dalley
Biologist, Ecological Sciences Section
Fisheries and Oceans Canada
80 East White Hills Road, P. O. Box 5667
St. John's, NL, A1C 5X1, CANADA
Phone (709) 772-5387, Fax (709) 772-5315
Kate.Dalley@dfo-mpo.gc.ca

From: Clarke, Keith
Sent: June 4, 2018 9:46 AM
To: Dalley, Kate L; Gregory, Robert; McKenzie, Cynthia
Cc: Meade, James
Subject: FW: Request for advice Grieg Aquaculture
Importance: High

Please see the request below from the CSAS office related to the review of the EA for the Grieg Aquaculture project. We have been specifically requested to review the section on “**Existing Aquatic Habitat**” and any associated “**Data Gaps**”. Seeing the short timelines for this review please send your comments directly to Jim in the CSAS office with a cc to me. Also notice the criteria we have been asked to address with respect to this information (see Jim’s email below).

Keith

From: Meade, James
Sent: June-01-18 2:20 PM
To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (**Note-SCROLL TO “EIS: Main Text”**)

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
Fisheries and Oceans Canada / Pêches et Océans Canada
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8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture



To
À

Keith Clarke
Section Head
Ecological Sciences Section

From
De

Kate Dalley
Ecological Sciences Section
Environmental Sciences Division

Security Classification - Classification de sécurité
Non classifié/Unclassified
Our File - Notre référence
Your File - Votre référence
Date
15 October 2018

Subject
Objet

Request for Input on the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project

I have reviewed the sections relevant to my area of expertise (Fish and Fish Habitat VEC) in the **Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project**. This EIS is intended to identify and assess the significance of biophysical and socio-economic effects of the Project while taking mitigation measures into consideration. In general, I found the topics considered within the relevant sections to be appropriate; however, the conclusions made throughout the document are rarely supported by existing information.

Section 2.5 – Monitoring and Mitigation Measures, was generally inclusive. Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat appendix, but the pertinent details should be presented within the main document.

Generally, in **Section 4.2 - Aquatic Existing Environment** and **4.8 - Data Gaps**, the topics are appropriate; however, the material provided within the sections are 1) inadequately researched and inconsistent in the level of coverage within, 2) too generic with little effort made to incorporate local information or relate to the study area, and 3) generally disjoint.

4.2.3 Fish and Fish Habitat

This section does not follow the topics of discussion as outlined in the text below this header making for a difficult read. There are also many other topics that are covered, but not offered in the outline. There are sources of information to describe the environment in Placentia Bay that have been overlooked. Traditional Ecological Knowledge is largely unused in this section; see the Community-Based Coastal Resource Inventories in Newfoundland and Labrador.

4.2.3.1 Study Area Overview – for components that Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

Water Temperature. There are bay wide long term data available from other sources. For example: <http://navigator.oceansdata.ca/public/>

Marine Sediment. Other data are available. For example:
Stehman, C.F. 1976. Pleistocene and recent sediments of northern Placentia Bay, Newfoundland. Can. J. Earth Sci. 13:1386-1392.

Wiley, J.D. 1976. Geochemistry and environmental implications of the surficial sediments in northern Placentia Bay, Newfoundland. Can. J. Earth Sci. 13:1393-1410.

Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the text.

Invasive Species. This section is very weak. There is plenty of other information available about AIS in Placentia Bay. Examples (not inclusive) are provided below. Also, Aquatic Invasive Species have not been considered in section 7.6. - Cumulative Effects.

Callahan, A.G., D. Deibel, C.H. McKenzie, J.R. Hall, and M.L. Rise. 2010. Survey of harbours in Newfoundland for indigenous and non-indigenous ascidians and an analysis of their cytochrome *c* oxidase I gene sequences. Aquatic Invasions. 5:31-39.

Matheson, K. C.H. McKenzie, P. Sargent, M. Hurley, and T. Wells. 2014. Northward expansion of the invasive green algae *Codium fragile* spp. *fragile* (Suringar) Hariot, 1889 into coastal waters of Newfoundland, Canada. BioInvasions Records. 3:151-158.
<http://dx.doi.org/10.3391/bir.2014.3.3.03>

American Lobster and Sea Scallop (and others). These sections are devoid of comment on recent population trends in Placentia Bay.

Restoration of Eelgrass Beds. Eelgrass is considered an ecologically significant species. Why only present information about restoration? Some key documents (not inclusive) include:

DFO. 2009. Does eelgrass (*Zostera marina*) meet the criteria as an ecologically significant species? DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2009/018.

Rao, A.S., R.S. Gregory, G. Murray, D.W. Ings, E.J. Coughlan and B.H. Newton. 2014. Eelgrass (*Zostera marina*) locations in Newfoundland and Labrador. Can. Tech. Rep. Fish. Aquat. Sci. 3113: vi + 19 p

Benthic Habitat. This section only comments on habitat immediately near proposed sites. Habitat should be discussed at the larger spatial scale.

Section 7.0 – Effects of the Project on the Environment, specifically, Section 7.1 Fish and Fish Habitat VEC, the report consistently fails to integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions made about the magnitude, extent, and duration of effects. Similarly, Section 7.6 – Cumulative effects, simply lists the potential activities that may have an effect but is devoid of any integration of expected influences or consideration of the existing conditions within the bay making any conclusion ill justified. Specific concerns within section 7.0 include:

Section 7.1.2.1. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Section 7.1.2.3. Deposition from the Sea Cages. This section is well documented and reported compared to others. That said, there is not enough information provided about the modelling exercise for determining the depositional contours to evaluate it. More detail from the Fish and Fish Habitat appendix should be presented here.

Section 7.1.2.8. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

Section 7.6.5.1. Assessment of Significance of Residual Cumulative Effects, Fish and Fish Habitat VEC. There is no evidence presented to predict effects as *not significant*. There is no supporting information or interpretation of local variables within this section.

Given the above information:

- 1) The baseline data and methodologies are insufficiently integrated to provide evidence for the predicted effects;
- 2) The mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects;
- 3) The level of certainty in the conclusions reached by the proponent on the effects is low;
- 4) The manner in which significance of the environmental effects have been determined are poorly supported and integrated with existing knowledge; and
- 5) The follow up program proposed by the proponent does not exist.

Please do not hesitate to contact me if you have any questions or require further clarification.

Kate Dalley
Ecological Sciences
Science Branch, NL Region

Meade, James

From: Meade, James
Sent: June-15-18 1:50 PM
To: Dalley, Kate L; Clarke, Keith
Subject: RE: Request for advice Grieg Aquaculture

Thanks Kate.
Very much appreciated!



Cheers,
Jim

From: Dalley, Kate L
Sent: June-15-18 1:49 PM
To: Clarke, Keith; Meade, James
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

You will find my input on the Grieg EIS attached. Any questions, let me know.

Kd

Kate L. Dalley
Biologist, Ecological Sciences Section
Fisheries and Oceans Canada
80 East White Hills Road, P. O. Box 5667
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Subject: FW: Request for advice Grieg Aquaculture
Importance: High

Please see the request below from the CSAS office related to the review of the EA for the Grieg Aquaculture project. We have been specifically requested to review the section on “**Existing Aquatic Habitat**” and any associated “**Data Gaps**”. Seeing the short timelines for this review please send your comments directly to Jim in the CSAS office with a cc to me. Also notice the criteria we have been asked to address with respect to this information (see Jim’s email below).

Keith

From: Meade, James
Sent: June-01-18 2:20 PM
To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
Fisheries and Oceans Canada / Pêches et Océans Canada
80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
Tel: (709) 772-3332
Fax/ Télécopieur: (709) 772-6100
E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

Section #	Section Title	Specific Subsections	Relevant Science Section to review/ provide advice
2.4.	Project Description	2.4.1.1. 2.4.2.2.	Aquaculture Aquaculture
2.5.	Sea Cage Sites	2.5.2.	Aquaculture/ Salmonids?
2.7.	Alternatives	2.7.3.	Aquaculture

2.8.	Accidents and Malfunctions	2.8.1. 2.8.2. 2.8.3.	Aquaculture/ Salmonids
3.3.	Valued Environmental Components	3.3.2.	Salmonids
4.2.	Aquatic Existing Environment	4.2.1. 4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4 4.2.3. 4.2.4.	Aquaculture or Oceanography? Ecological Sciences Salmonids
4.8.	Data Gaps	4.8.1. 4.8.2.	Ecological Sciences Salmonids
7.0.	Effects of the Project on the Environment	7.2.	Salmonids
7.6.	Cumulative Effects	7.6.4. 7.6.5.2.	Aquaculture/ Salmonids Salmonids
7.7.	Accidents	7.7.1.	Salmonids/ Aquaculture
7.8.	Follow-up Monitoring	7.8.1. 7.8.2.	Aquaculture/ Salmonids Aquaculture/ Salmonids
7.9.	Assessment Summary and Conclusions	7.9.1.2. 7.9.1.6. 7.9.2. 7.9.3.	Salmonids Salmonids/ Aquaculture Salmonids/ Aquaculture Salmonids/ Aquaculture
8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture

Meade, James

From: Gregory, Robert
Sent: June-15-18 1:55 PM
To: Meade, James
Cc: Mansour, Atef A H; Clarke, Keith
Subject: RE: Craieg Aquaculture
Attachments: Grieg NL EIS 2018 RSG review comments 2018-06-15.doc

Hi Jim,

Here is my review. I wish I had more time to put into this. The review period is just far too short to do the best job possible, in my opinion. I did the best I could under the time constraints. It is what it is.

Cheers,

Bob

Dr. Robert S. Gregory, Research Scientist
Ecological Sciences Section
Fisheries & Oceans Canada
80 E. White Hills Rd., PO Box 5667 St. John's NL A1C 5X1 CANADA

1-709-772-4491 phone
1-709-772-5315 fax
email: Robert.Gregory@dfo-mpo.gc.ca



MEMORANDUM

NOTE DE SERVICE

To
A
Jim Meade
Centre for Science Advice
Science Branch
NL Region

From
m
De
Dr. Robert S. Gregory, Research Scientist
Fisheries & Oceans Canada
Environmental Sciences Division
Ecological Sciences Section

Security Classification - Classification de sécurité
Non classifié/Unclassified
Our File - Notre référence
Your File - Votre référence
Date
June 15, 2018

Subject
Objet
EIS Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project
Grieg NL

Jim,

I have examined the above EIS by Grieg NL.

In order to place my comments in their appropriate context, I have looked over the entire report. I then examined the following sections of the main report in detail – Sections 3, 4, and 7; and also the Component Studies: Fish and Fish Habitat.

This report appears to be complete. However, I noticed several omissions, some overstatements and distracting passages, as well as at least one misrepresented statement in the sections I looked at most closely.

Overall, I found the elements of the report which focused on the technological basis of the EIS to be well developed, clear and easy to interpret. Likely, this was due to the experience of the proponent with this type of enterprise. Where the EIS falls short of what I would have liked to have seen was in the areas of the report dealing specifically with impacts on the local and broader environment. Many of these deficiencies appeared to be due with a lack of detailed knowledge of the local environment in the vicinity of the works and what constitutes a VEC, in my opinion.

I had only had about a day to review this document; therefore, I have almost certainly missed other inconsistencies and omissions.

Here are my specific comments as I observed them:

1. The Executive Summary seems excessively long to me – being around 70 pages. Some sections are not even that long;
2. Roman Numeral pagination is confused after “pdf page 54”, prior to “Page 1”;

3. Page 68 (pdf page 137). I was not clear on the stock origin of the lumpfish (cleaner fish) was? Also, it impresses me that the density of lumpfish – i.e., 16,000 per cage was very high. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play;
4. Page 124 Table 2.25 I found the interpretation of the probability and impact of escapees to the environment was lacking in detail and overly optimistic that there would be little to no problems. The “assessment” was thin.;
5. Page 125 Section 3.3.6 is not a “VEC” in the conventional context of an EIS; it reads as a business “sales pitch”. I am forced to conclude that the increasingly frequency of the use of “ecosystem” in the business literature in the past ten years is at play here. These passages would appear to fine in the business context, but have no place in a biological or ecological one. Therefore they do not belong in the ecological portions of the report. This pattern repeats itself at several points in the document in Section 3, 4, & 7.;
6. Page 130 Project Area – the Marine Industrial Park may have runoff from the facilities located there under some scenarios, with resulting runoff potential into the marine environment; yet, I did not see any mention or the evaluation of the potential for that outcome. It is difficult for me to believe the probability is in fact Zero, as the wording in the text implies.;
7. Page 131 Top of page. Again, socioeconomics does not belong in this section of the report.;
8. In its entirety, Section 3.0 appears to me to be incomplete.
9. Page 145 Storm surge indicates ~0.03 m (i.e., that is only 3 cm!!). This must be a typographic error.
10. Page 164 The successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density - this is already known from studies performed in Placentia Bay – see Matheson et al. 2016 MEPS. The evidence for this is rather conclusive and well documented, yet the supporting paper has been published for two years. The proponent should not cite “pers. comm.” sources when published accounts from the area are readily available.
11. Page 359 & 377. The tables starting in these two pages are understating the likelihoods as “NS”. The levels of confidence by definition, must be high if NS is a valid response to a risk. In that the proponent has a moderate level of risk throughout these tables indicates to me that the risk of each outcome cannot be in fact “NS”.
12. Page 413-414 Section 7.5 should be removed from Section 7. It is economic, not ecological in its approach (see previous comments - #5 & #7).;
13. Component Studies: Fish and Fish Habitat, Page 14 The top paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. The referenced document has no text in it that provides such information. I have no doubt it lies in another document I could not find cited.

- 3 -

Sincerely,

Bob Gregory (4491)

cc. Atef Mansour, Division Manager - Environmental Sciences Division
Keith Clarke, Section Head - Ecological Sciences Section

No information has been removed or severed from this page

Meade, James

From: Meade, James
Sent: June-18-18 8:42 AM
To: McKenzie, Cynthia
Subject: RE: Request for advice Grieg Aquaculture

Thanks for this Cynthia,
Definitely not too late!!

Cheers,
Jim

From: McKenzie, Cynthia
Sent: June-15-18 6:12 PM
To: Meade, James
Cc: Clarke, Keith; Hendry, Christopher
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,
I hope it is not too late to comment on the Grieg report.
I have a few comments mostly dealing with AIS and HABs.

Aquatic Invasive Species

P. 160 Section 4 Existing Environment under Invasive Species

They state here that the primary concern in Placentia Bay is green crab. This is not true in this case as, although green crab are well known and well distributed in Placentia Bay, in this case the primary concern for Aquatic Invasive species is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically Vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are more that are not here yet but my points can be made with these.

I have had this discussion with Geoff Perry early in the planning of the new aquaculture sites in Placentia Bay. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and even those not using this area may find AIS at these other smaller harbours). Marystown and the Burin have been found to have vase tunicate and is highly invasive and economically significant. The movement of this species is prohibited by the AIS regulations in the Fisheries Act. There are three major reasons for concern what are not addressed in the document- Environmental Assessment for Placentia Bay.

1. Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue for them but more importantly they will be spreading this regulated –prohibited species around PB. We (DFO, DFLR, NAIA) have spent over \$100K to contain vase tunicate in one or two places in PB. It is important that Grieg have a plan to not spread it around the bay on their vessels.
2. P. 103, P. 410 section 7 mitigation- regarding AIS and Biofouling “they will monitor AIS and report to DFO” this sounds fine but they cannot simply report, they will be responsible for the removal of the invasive tunicate. They received an experimental licence (2017) to put in plates to monitor the proposed sites for AIS biofouling. I do not know what happened to this data or if it was collected, but it is not mentioned in the report.
3. Which brings me to the final point, although they mention cleaning the nets for biofouling in many places they cannot simply spray wash or clean the AIS species they will spread across the water and infect other places. This

will be costly and a major pain, so it is particularly important in point 1 that no AIS makes it to their site in the first place. Prevention is key here and I did not see any reference to how they are going to prevent this introduction.

So this is a major flaw in the review regarding the AIS Regulations of the Fisheries Act and evidently they see green crab as the AIS issue but it is in fact tunicates which can cause a great deal more harm/cost for an aquaculture operation. Not to mention impact on the environment. This needs to be addressed.

Harmful Algae Blooms – not too much to add here although P. 352 Effect of the environment on the project under HAB sites many times (almost the only reference and the source of the HAB map – which I created by the way) was DFO 2010c. This was not cited in the references and I do not know what DFO 2010 this reference is so it was hard for me to assess this information. In general it was correct although a little under estimated as I know the finfish aquaculture industry on the south coast considers HABs a concern – it is certainly a major issues in BC with increasing concern in NL.

I hope this information is helpful to you. Please let me know if you have any questions or need any additional information.

Best regards,
Cynthia

From: Clarke, Keith
Sent: June-04-18 9:46 AM
To: Dalley, Kate L; Gregory, Robert; McKenzie, Cynthia
Cc: Meade, James
Subject: FW: Request for advice Grieg Aquaculture
Importance: High

Please see the request below from the CSAS office related to the review of the EA for the Grieg Aquaculture project. We have been specifically requested to review the section on “**Existing Aquatic Habitat**” and any associated “**Data Gaps**”. Seeing the short timelines for this review please send your comments directly to Jim in the CSAS office with a cc to me. Also notice the criteria we have been asked to address with respect to this information (see Jim’s email below).

Keith

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Sent: June-01-18 2:20 PM
To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith
Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

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The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

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- The level of certainty in the conclusions reached by the proponent on the effects;
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- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
Fisheries and Oceans Canada / Pêches et Océans Canada
80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
Tel: (709) 772-3332
Fax/ Télécopieur: (709) 772-6100
E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

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2.5.	Sea Cage Sites	2.5.2.	Aquaculture/ Salmonids?
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3.3.	Valued Environmental Components	3.3.2.	Salmonids
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	Environment		
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8.0.	Environmental Protection		Aquaculture/ Salmonids
	<i>Component Study: Wild Atlantic Salmon + Appendices</i>		Salmonids/ Aquaculture

Morris, Robyn

From: Abbott, Melissa H
Sent: Monday, June 18, 2018 9:27 AM
To: Morris, Robyn
Subject: RE: Grieg Aquaculture

That is good lol

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Morris, Robyn
Sent: Monday, June 18, 2018 9:27 AM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

We can yep, but I haven't gotten to read through the sections yet.

Robyn Morris

Regional FM Officer
Fisheries Resource Management

Phone: (709) 772.8859
e-mail: robyn.morris@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Monday, June 18, 2018 9:26 AM
To: Morris, Robyn <Robyn.Morris@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Maybe we could chat about this....

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Friday, June 15, 2018 2:28 PM
To: Morris, Robyn <Robyn.Morris@dfo-mpo.gc.ca>

Cc: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>

Subject: Fw: Grieg Aquaculture

Fyi

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>

Sent: Thursday, May 31, 2018 11:16 AM

To: Simms, Jason; Coffin, David (David.Coffin@dfo-mpo.gc.ca); Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry

Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)

Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework

Resource Management and Aboriginal Fisheries

Fisheries and Oceans Canada

St. John's, NL

Phone: (709) 772-2915

e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger

Sent: Wednesday, May 30, 2018 1:40 PM

To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>

Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>

Subject: Grieg Aquaculture

Please see attached request for review. If anyone in you Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson

Sr. Biologist - Mining

Fisheries Protection Program

Dept. of Fisheries and Oceans

Telephone: (709)772-3296 (O) [REDACTED] (cell)

E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Roach, Jody

From: Roach, Jody
Sent: Monday, June 18, 2018 9:56 AM
To: Rolls, Elaine; Temple, Glenn (Glenn.Temple@dfo-mpo.gc.ca)
Subject: RE: Grieg Aquaculture

Good Morning:

Comments due today on the Grieg EIS if you have any.

Thanks,
Jody

From: Roach, Jody
Sent: Monday, June 4, 2018 10:27 AM
To: Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Temple, Glenn (Glenn.Temple@dfo-mpo.gc.ca) <Glenn.Temple@dfo-mpo.gc.ca>
Cc: Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Good Day Elaine/Glenn:

Please find attached a link a to the Environmental Impact Statement for the Grieg aquaculture project and the associated sections that require review by Fisheries Management. Please review and provide your comments back to me by COB **Monday, June 18th** for roll-up.

Thanks,
Jody

Jody Roach

Senior Compliance Officer
Fisheries and Oceans Canada
Conservation and Protection
Email : jody.roach@dfo-mpo.gc.ca
Tel: 709-683-6131

From: Walsh, Jerry
Sent: Thursday, May 31, 2018 1:35 PM
To: Roach, Jody <Jody.Roach@dfo-mpo.gc.ca>; Shea, Paul <Paul.Shea@dfo-mpo.gc.ca>; Warren, Janet <Janet.Warren@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

For your review and comments, will you take the lead on this one Jody...tx

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason; Coffin, David; Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: FW: Grieg Aquaculture

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Thanks,

Melissa

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http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

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Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

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Sent: Wednesday, May 30, 2018 1:40 PM

To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>

Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>

Subject: Grieg Aquaculture

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If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans

Telephone: (709)772-3296 (O) [REDACTED] (cell)

s.16(2)(c)

E-mail: Roger.Johnson@dfo-mpo.gc.ca

No further information has been removed or severed from this page

Rolls, Elaine

From: Rolls, Elaine
Sent: Monday, June 18, 2018 11:48 AM
To: Abbott, Melissa H; Hawkins, Laurie
Cc: Roach, Jody
Subject: RE: Grieg Aquaculture

Thanks I will have a look today as well...might have to lock the door...I have no clerk here now..

Elaine

From: Abbott, Melissa H
Sent: Monday, June 18, 2018 11:13 AM
To: Hawkins, Laurie; Rolls, Elaine
Cc: Roach, Jody
Subject: RE: Grieg Aquaculture

Hi ladies
Jody is reviewing this document for C&P Regional as well.

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Hawkins, Laurie
Sent: Monday, June 18, 2018 11:10 AM
To: Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>
Cc: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Elaine, I realize you have been away a bit however, wondering if you have any info for me?

From: Abbott, Melissa H
Sent: June-18-18 9:25 AM
To: Simms, Jason; Coffin, David; Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry; Diamond, Julie
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: RE: Grieg Aquaculture

Hi Folks
A friendly reminder that comments are due June 21 - Thanks

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries

Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Abbott, Melissa H

Sent: Thursday, May 31, 2018 11:17 AM

To: Simms, Jason <Jason.Simms@dfo-mpo.gc.ca>; Coffin, David (David.Coffin@dfo-mpo.gc.ca) <David.Coffin@dfo-mpo.gc.ca>; Dunne, Erin <Erin.Dunne@dfo-mpo.gc.ca>; Ball, Dave <Dave.Ball@dfo-mpo.gc.ca>; Penney, Kim <Kimberley.Penney@dfo-mpo.gc.ca>; Hawkins, Laurie <Laurie.Hawkins@dfo-mpo.gc.ca>; Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>

Cc: Burton, Ron <Ron.Burton@dfo-mpo.gc.ca>; Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Rumbolt, Annette <Annette.Rumbolt@dfo-mpo.gc.ca>; Cahill, Paul <Paul.Cahill@dfo-mpo.gc.ca>; Walsh, Ray <Ray.Walsh@dfo-mpo.gc.ca>; Tobin, Derek (Duke) <Derek.Tobin@dfo-mpo.gc.ca>

Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in your Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
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Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

No further information has been removed or severed from this page

Rolls, Elaine

From: Rolls, Elaine
Sent: Monday, June 18, 2018 1:53 PM
To: Roach, Jody
Subject: RE: Grieg Aquaculture

Ok looking at now...busy time of year but also no clerk so providing front counter services not ideal and I have to leave tomorrow [REDACTED]

[REDACTED]

From: Roach, Jody
Sent: Monday, June 18, 2018 1:30 PM
To: Rolls, Elaine
Subject: RE: Grieg Aquaculture

Yes, it was a June 21st deadline to me too but I figured if you and Glenn had comments, I'd have a couple of days (if need be) to roll them up.

Busy time of year, hey??

From: Rolls, Elaine
Sent: Monday, June 18, 2018 11:40 AM
To: Roach, Jody <Jody.Roach@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

Haven't even had a chance to open. Melissa e-mailed me it with a June 21st deadline for comments.

Swamped here an now no clerk!! I'm pulling my hair out

Elaine Rolls
C&P Supervisor
Fishery Officer / Agent des Pêches
Conservation and Protection / Conservation et Protection
Box 1208, 7 Harris Drive Industrial Park / C.P. 1208 Harris Drive Industriel Parc
Marystown, NL A0E 2M0 / Marystown, Terre Neuve et Labrador A0E 2M0
Tel: (709) 279-7850 or [REDACTED] (cell) Fax / Copieur: (709) 279-7860
Email / Courriel: Elaine.Rolls@dfo-mpo.gc.ca

From: Roach, Jody
Sent: Monday, June 18, 2018 9:56 AM
To: Rolls, Elaine; Temple, Glenn
Subject: RE: Grieg Aquaculture

s.16(2)(c)

s.19(1)

Good Morning:

Comments due today on the Grieg EIS if you have any.

Thanks,
Jody

From: Roach, Jody
Sent: Monday, June 4, 2018 10:27 AM
To: Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Temple, Glenn (Glenn.Temple@dfo-mpo.gc.ca) <Glenn.Temple@dfo-mpo.gc.ca>
Cc: Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Good Day Elaine/Glenn:

Please find attached a link a to the Environmental Impact Statement for the Grieg aquaculture project and the associated sections that require review by Fisheries Management. Please review and provide your comments back to me by COB **Monday, June 18th** for roll-up.

Thanks,
Jody

Jody Roach
Senior Compliance Officer
Fisheries and Oceans Canada
Conservation and Protection
Email : jody.roach@dfo-mpo.gc.ca
Tel: 709-683-6131

From: Walsh, Jerry
Sent: Thursday, May 31, 2018 1:35 PM
To: Roach, Jody <Jody.Roach@dfo-mpo.gc.ca>; Shea, Paul <Paul.Shea@dfo-mpo.gc.ca>; Warren, Janet <Janet.Warren@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

For your review and comments, will you take the lead on this one Jody...tx

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason; Coffin, David; Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

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Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in you Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Norman, Leslie

From: Norman, Leslie
Sent: June-18-18 2:52 PM
To: Paul Glavine
Subject: FW: Grieg Aquaculture
Attachments: Request to P&A BBP.docx

Here ya go! ☺

From: Johnson, Roger
Sent: May-30-18 2:58 PM
To: Norman, Leslie
Cc: Pilgrim, Bret
Subject: Grieg Aquaculture

As discussed please find attached a request for review of the EIS for the above mentioned project. I have indicated the section that may be of particular interest to your Branch, however if you wish to comment on other sections please feel free to do so.

If you have any questions please feel free to contact me at anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

Policy and Economics Branch is requested to provide input on this project, particularly with respect the description of current fisheries and other marine stakeholders in the area of the project. The specific section in the EIS would be **Section 4.4** although current use of the area is mentioned in other parts of the EIS.

In particular, DFO provide needs to provide advice on:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the review.

The deadline for comments is June 26, 2018.

Tricco, Chelsie

From: Tricco, Chelsie
Sent: Monday, June 18, 2018 3:38 PM
To: Diamond, Julie
Subject: RE: Grieg Aquaculture EIS

Hi Julie,

I reviewed the sections of the Grieg EIS as indicated by Melissa below and have the following concern/comments as well as the Fish and Fish Habitat VEC, regarding potential impact on groundfish and groundfish harvesters.

- In terms of groundfish stocks and the fishery the main concern would be regarding 3Ps inshore cod fishery (26% of landings in 3Ps from 2010-2016, with landings declining), in terms of overlap between the fishery and the fish farm within the proposed Grieg sea cage sites in Placentia Bay (i.e. Rushoon, Merasheen, Long Harbour, Gallows Harbour, Ship Island, brine Islands, Iona Islands). Concerns due to overlap relate to:
 - potential for reduction of fishing area;
 - impact on fish habitat due to feeding; fish mortality; deposition of organic material; and use of vessels for fish farm operations.
 - Real or perceived impacts on wild fish populations including Atlantic cod from use of detergents, therapeutants and antibiotics.
 - Real or perceived impacts on wild fish populations including Atlantic cod from pathogens/viruses in the sea pens including sea lice.
 - Potential for increased presence of large predators (sharks) due to presence of salmon cages.
 - Accidental loss of nets, lines and cages due to weather events etc. causing 'ghost fishing'
- The other main fisheries in the area are not groundfish (snow crab 21%, whelks 15%, herring 7%, lobster 4%, scallops 4%), however it should be noted that snow crab landings and value have also been declining since 2014, and has impacted incomes of 3Ps fish harvesters. American plaice has been under moratorium since 1993 but is caught as bycatch, primarily in directed Atlantic cod and witch flounder fisheries in June and July in Placentia Bay.
- Placentia Bay is reported to have the largest Atlantic cod spawning stock (Templeman 2007) within the Northwest Atlantic – one of the key reasons the area was identified as an EBSA (Placentia Bay Extension EBSA) (<http://waves-vagues.dfo-mpo.gc.ca/Library/40610834.pdf>)
- The concerns above are noted in the Fish and Fish Habitat VEC (Table 7.1., Table 7.2, Table 7.3) and have been assessed as 'not significant negative environmental effect' with a 'medium to high level of confidence'. It is noted within the EIS that the use of therapeutants and antibiotics would only be used as a 'last resort' based on guidance from veterinarians, but I wanted to bring this to your attention given the important fish recruitment events, particularly for Atlantic cod, in the Placentia Bay Extension EBSA.

Chelsie Tricco

Regional FM Officer
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Telephone: (709) 772-2499
E-mail: Chelsie.Tricco@dfo-mpo.gc.ca

From: Diamond, Julie
Sent: Monday, June 18, 2018 10:04 AM
To: Tricco, Chelsie <Chelsie.Tricco@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

As discussed.
Julie

From: Abbott, Melissa H
Sent: Monday, June 18, 2018 9:25 AM
To: Simms, Jason <Jason.Simms@dfo-mpo.gc.ca>; Coffin, David <David.Coffin@dfo-mpo.gc.ca>; Dunne, Erin <Erin.Dunne@dfo-mpo.gc.ca>; Ball, Dave <Dave.Ball@dfo-mpo.gc.ca>; Penney, Kim <Kimberley.Penney@dfo-mpo.gc.ca>; Hawkins, Laurie <Laurie.Hawkins@dfo-mpo.gc.ca>; Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>; Diamond, Julie <Julie.Diamond@dfo-mpo.gc.ca>
Cc: Burton, Ron <Ron.Burton@dfo-mpo.gc.ca>; Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Rumbolt, Annette <Annette.Rumbolt@dfo-mpo.gc.ca>; Cahill, Paul <Paul.Cahill@dfo-mpo.gc.ca>; Walsh, Ray <Ray.Walsh@dfo-mpo.gc.ca>; Tobin, Derek (Duke) <Derek.Tobin@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

Hi Folks
A friendly reminder that comments are due June 21 - Thanks

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason <Jason.Simms@dfo-mpo.gc.ca>; Coffin, David <David.Coffin@dfo-mpo.gc.ca>; Dunne, Erin <Erin.Dunne@dfo-mpo.gc.ca>; Ball, Dave <Dave.Ball@dfo-mpo.gc.ca>; Penney, Kim <Kimberley.Penney@dfo-mpo.gc.ca>; Hawkins, Laurie <Laurie.Hawkins@dfo-mpo.gc.ca>; Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>
Cc: Burton, Ron <Ron.Burton@dfo-mpo.gc.ca>; Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Rumbolt, Annette <Annette.Rumbolt@dfo-mpo.gc.ca>; Cahill, Paul <Paul.Cahill@dfo-mpo.gc.ca>; Walsh, Ray <Ray.Walsh@dfo-mpo.gc.ca>; Tobin, Derek (Duke) <Derek.Tobin@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

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Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

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If you have any questions now or in the future please feel free to forward them to me anytime.

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E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Forsey, Sue
Sent: Monday, June 18, 2018 4:05 PM
To: Pilgrim, Bret
Cc: Johnson, Roger
Subject: FW: leatherback question

Hi Bret,

Roger mentioned to me about the Greig EIS and possible mitigation measures regarding leatherbacks and moorings. I checked with Jack Lawson and he had a few suggestions (below). I'm out of the office the rest of this week, just passing this along now so you'd have it. We can chat about it when I get back on Monday, if that works.

Sue

From: Lawson, Jack
Sent: June-15-18 4:14 PM
To: Forsey, Sue
Subject: Re: leatherback question

A few things have been discussed:

- use shortest possible line length so that even at low tide there is the least amount of slack rope floating at the surface or underwater
- for each fixed mooring use the fewest vertical line buoys (eg one high flyer per mooring)
- use the smallest rope diameter possible

That's all I can recall

Regards, Jack

On Jun 15, 2018, at 14:40, Forsey, Sue <Sue.Forsey@dfo-mpo.gc.ca> wrote:

Hi Jack,

I was getting some questions (in relation to Greig EIS) about mitigation measures for leatherback turtles for moorings. I went through that spreadsheet we developed back in 2016-17 with FPP and the other regions that had the information on mitigation measures for specific activities and species (remember all the conference calls?). For moorings, all that was specified was just a general comment of entanglement concerns and no specific mitigation measures. For the measures to avoid harm section, there was just the timing window regarding when the turtles are likely to be here, avoiding operating machinery if a turtle was in the area, and avoiding areas of critical habitat (not yet identified, of course).

Would there be any other possible mitigation measures?

Thanks.

Sue

Meade, James

From: Ratsimandresy, Andry
Sent: June-19-18 9:42 AM
To: Meade, James; Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

Just an update on the text I sent, it should read , "only measurements at one point for each site" (not BMA).

Sorry for the confusion,

Andry

-----Original Message-----

From: Meade, James
Sent: 2018-June-19 8:14 AM
To: Donnet, Sebastien G; Ratsimandresy, Andry
Subject: RE: Request for advice Grieg Aquaculture

Thank you Gents,
I really appreciate your review and comments.

Cheers,
Jim

-----Original Message-----

From: Ratsimandresy, Andry
Sent: June-19-18 6:12 AM
To: Meade, James
Cc: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

Just wanted to add important points with respect to the deposition model:

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such the current data to be used to force the model should correspond to the same period as the planned season for high feeding. Besides the fact that the timeseries are too short, they were collected during winter time and would not correspond to that period.

_ The proponent states that

Page 49. "Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."

However, only measurements at one point for each BMA are reported making the above an overstatement as far as selection of location based on currents and direction.

From: Donnet, Sebastien G
Sent: June 18, 2018 9:43 PM
To: Meade, James
Cc: Ratsimandresy, Andry
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

here below are my notes, sorry to do that by email but having trouble attaching a file via webmail from home (wont do it), so here it is. Main issue is on the dispersion modeling which uses, though the modelers had not much choices, too short of currents timeseries to hope being statistically representative. Same observation than Andry. We could propose some suggestions though (e.g. Ma et al. 2012 model results). Another point of importance, I think, is on the logistics proposed and the idea of BMAs which appears somewhat in conflict to me (cross-contamination issue). I have not been able to check the provincial official BMAs guidelines by lack of time. In fact, I did not review the whole document either due to time constrain; I could only start my review today and below is all I got:

Major revisions (main text):

"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination." (p. xxix). It is unclear how this will be achieved since some of the proposed routes cross BMAs as Figure 2.52 and 2.53 shows. Petit Forte harbour deserves Rushoon, Merasheen and Red Island BMAs; almost all of them that is. Specific areas for embarkation/ disembarkation within a given BMA are not sufficient as pathogen could be present in most of that given BMA and could be transmitted to another BMA. In fact, this proposed logistics seems to go against the whole idea/purpose of BMAs. p. 98 says: "Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." but they would use routes crossing BMAs as well as shown in Figure 2.53; thus not really mitigating risk of cross-contamination (same argument/problem than for the crew change sites).

"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)" (p xxxiv); we strongly disagree. Currents data used are way too short to determine dominant forcing (e.g. tide vs. wind) and variability. One would need a minimum of 1 month (30 days) for the tides to be determined with reasonable accuracy and on the order of a year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, "siting of sea cages at locations with suitable currents and depth to distribute organic waste", repeated a number of times within the document and used as an argument for most of the VEC potential effects being "not significant" is not proven (demonstrated) by this document/study.

"Data gaps, particularly those related to wild Atlantic salmon migration routes and the degree of ecological interaction between wild salmon and escaped farmed salmon, limit the confidence in some effects predictions." (p. x1). In our view, the physical environment knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged, mentioned and addressed. Water structure seasonality, i.e. temperature and salinity, is not shown either (adequate temperature data were collected, however, so gap is largely on salinity).

"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." (p. 99). While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to that potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to show if this could be an issue or not.

"In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality." p99 is a misleading statement, one only need 1 strong winter to get into trouble. A good example is the 2014 winter which significantly impacted the industry present in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. e.g. do we expect temperature to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the region (Newfoundland shelf)?

"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." p100-101. These data would be highly valuable to, and should be communicated to, regulators. Common understanding of SOPs should also be planned and achieved between the proponent and regulator to ensure data quality.

Section 4.1.2.3 Wind Speed and Direction: while the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc. (threshold to be determined upon structure tolerance). Wind direction variability (seasonality) is also not sufficiently documented (see comments below about Appendix D/V).

Section 4.1.2.4 Climate Change: should provide with more information regarding to future change in storm frequency and intensity as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014; Recent Arctic amplification and extreme mid-latitude weather, Nature Geoscience, DOI: 10.1038/NGEO2234). These are of importance to aquaculture and would better inform risk factors. Note: list of citations regarding this aspect in Appendix V (Oceans Ltd Metocean report), section 2.7.1, is short and somewhat outdated (latest reference is from 2008).

Section 4.2.2.2 Ocean Currents, p143-144. This section completely fails to describe the variability of the currents that have been observed and modelled over the years; likely to be the most important point. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012; Modelling Temperature, Currents and Stratification in Placentia Bay, Atmosphere-Ocean 50:3, 244-260, DOI: 10.1080/07055900.2012.677413) is not even referenced! Appendix D (V) from Oceans Ltd states "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important." This must be clearly stated in the main text since it implies a statistical variability of the currents much greater than that of the, more easily known, one of the tide alone. With tide only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle); in this case, longer timeseries would be necessary to be representative. Wind forcing and the Labrador Current are variable on timescale of days to seasons; implying the need for long timeseries. Clearly, the data collected for this study by DHI and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications with the modeling results presented in section and detailed in Appendix B of the Fish and Fish Habitat component (Volume 3).

Section 4.2.2.3 Wind and Wave Action: due to its nature the MSC50 dataset (NOTE: source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on (created from) a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay) and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at

any given site and for any given season. At the very least, comparison with available data should be documented, limitations should be clearly stated and description on how this uncertainty is being mitigated should be provided.

Section 4.2.3.2 Project Area: subzero, shown in Table 4.10, temperature can be lethal to salmon. This paragraph should indicate whether this is considered as a concern or not.

Section 6.8: "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification." The timeseries shown in section 4.2.2.2 and collected for this project are way too short to state something like that. This statement is also not quantitative what-so-ever. What is meant by "adequate"?

Section 7.1.2.3 Deposition from the Sea Cages: due to the severe limitations of the ocean current timeseries, i.e. they are way too short, the estimated benthic loading of carbon given in this section cannot really be trusted (see comments below on Appendix B/AMEC report).

Major revisions of Appendix B of Fish and Fish Habitat component (AMEC) -general comment:-

The ocean current timeseries used for this study are way too short to give statistically robust estimates of dispersion. Looping a few days timeseries on itself to make it a month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the of Fish and Fish Habitat component says that tides are a minor component of the total variability (~15%); indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents power spectrum (<0.5 cycles per day or less; Schillinger et al. 2000); indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). Longer timeseries should be used to represent this large variability.

What is the basis of 1,124 kg/cage/day feed input? Is it the maximum load (worst case scenario), median or something-else?

Major revisions of Appendix V [=Appendix D of Fish and Fish Habitat component; Oceans Ltd Metocean study]:

Section 2.3: this section does not properly describe the wind forcing seasonality. i.e. prevailing directions potentially changing seasonally, as stated in the text. Monthly wind roses should be added to illustrate it.

p.28 "The positive phase of the NAO index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track." Should indicate the resulting effect on the ocean/water column as described in (for instance) Colbourne et al. 2017 (Colbourne, E., Holden, J., Snook, S., Han, G., Lewis, S., Senciall, D., Bailey, W., Higdon, J., and Chen, N. 2017. Physical oceanographic conditions on the Newfoundland and Labrador Shelf during 2016 - Erratum. DFO Can. Sci. Advis. Sec. Res. Doc. 2017/079. v + 50 p.)

Section 3.1, p36: "Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters." this statement is too simplistic and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest in Ma et al. 2012 show a radically different pattern (Figure 9 of their paper). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. In addition, the report does not show that wind is "predominately from the southwest during all seasons", only an annual wind rose is provided (Figure 2.2) which does not justify such a statement. The text of section 2.3 in fact states "There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the

winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter.”

Section 3.2: due to its nature the MSC50 dataset (NOTE: source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on (created from) a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay) and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. At the very least, comparison with available data should be documented, limitations should be clearly stated and description on how this uncertainty is being mitigated should be provided. Which dataset were used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Section 3.4: more recent papers on surge in the study area should be cited. e.g. Ma et al. 2017 (Modelling the response of Placentia Bay to hurricanes Igor and Leslie, Ocean Modelling 112 (2017) 112–124).

Minor revisions (main document):

Section 3.5 Data Gaps section, p129, does not identify nor list the gaps nor does it indicate where in the document would those gaps identified/documentated.

Section 3.7.4.3 Duration and Frequency of Effects, p133, categories can be simplified as:

- <1 month -12 months: short-term
- 13-72 months: medium-term
- >72 months: long-term

Section 4.1.1 Overview, p138: Appendix V appears to be labeled as Appendix D of Fish and Fish Habitat component

Section 4.1.2.3 Wind Speed and Direction, p140: wind rose(s) should be added to illustrate the statement “The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer.” Sentence “The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter.” is unclear.

p141 “A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period.” A reference should be provided for this statement.

Section 4.2.2.4 Flood and Tidal Zones: “During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.” Appendix V indicates a surge of 0.93 m in p67.

4.2.3.1 Study Area Overview, Figure 4.6 and Figure 4.7. Standard deviations should be indicated to illustrate the variability.

Section 6.5: “Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).” Correlation could not be found in LGL 2018b.

Minor revisions (Appendix V):

Appendix V general comment: all stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). Quality of the maps is also pretty poor and blurry and would benefit from a higher resolution.

Appendix V, section 3.1 p36 "In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay. " need to indicate reference here and elsewhere such statement are being made. Other example is "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."

Appendix V, section 3.1.1 Data Sources: please provide reference to the dataset that have already been documented. e.g. MUN data are as data reports (Hart et al 1999; Schillinger et al. 2000)

Appendix V, section 3.1.1 Data Sources: I believe that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be check and text modified if this is the case.

Appendix V, section 3.1.2 "At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20m." It is highly dubious that currents would consistently flow consistently in the same direction anywhere in the bay. Its long term mean, vector-averaged, might be. It is also very unclear where this info was taken (reference? Mooring name?). Text need to be checked and corrected accordingly.

Appendix V, section 2.1.1: MSC50 dataset is not correctly referenced/cited (Swail et al 2006).

From: Meade, James
Sent: Monday, June 18, 2018 11:38 AM
To: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

No worries,
Working on other comments; didn't expect yours until COB so all good!

Thanks and Cheers,
Jim

From: Donnet, Sebastien G
Sent: June-18-18 1:07 PM
To: Meade, James
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

still on it, likely be end of day before I send something.
sorry

Sebastien

From: Meade, James
Sent: 2018-June-13 11:05
To: Donnet, Sebastien G; Ratsimandresy, Andry

Subject: RE: Request for advice Grieg Aquaculture

Excellent-thanks guys!!

From: Donnet, Sebastien G
Sent: June-13-18 11:04 AM
To: Ratsimandresy, Andry; Meade, James
Subject: RE: Request for advice Grieg Aquaculture

ok. Monday will do.

From: Ratsimandresy, Andry
Sent: 2018-June-13 09:46
To: Meade, James
Cc: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Thanks Jim.

Andry

From: Meade, James
Sent: 2018-June-13 9:45 AM
To: Ratsimandresy, Andry
Subject: RE: Request for advice Grieg Aquaculture

COB Monday? Tuesday noon would be the absolute latest.

Thx,
Jim

From: Ratsimandresy, Andry
Sent: June-13-18 9:39 AM
To: Meade, James
Cc: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

We, Sebastien and myself, are in the process of reviewing the oceanographic part of the request. As Sebastien is out of the office this week, could we submit our review to you early next week?

Thanks,

Andry

From: Meade, James
Sent: 2018-June-09 9:11 AM
To: Hamoutene, Dounia
Cc: Ratsimandresy, Andry; Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Dounia,

Thanks for this - your review, and quick turnaround are greatly appreciated!

I plan to go through your comments today and tomorrow and hope to be in touch very early in the week should I have any questions.

Cheers,

Jim

From: Hamoutene, Dounia

Sent: June-07-18 2:45 PM

To: Meade, James

Cc: Ratsimandresy, Andry; Donnet, Sebastien G

Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

Unfortunately I do not have time to spend in more than a quick review of the document (which is considering the size of the docs easier said than done). I have made a few comments in the main text and you have to indicate to me how I can share it with you. I have limited my comments to the benthic deposition aspects of the project although I could contribute to the farmed-wild interactions (not only salmon-salmon) as well I have limited the scope of my advice in light of the little time I have. In addition, Carole and her staff will provide ample information on wild salmonids and Keith and his crew on EBSAs and other ecosystem considerations. Considering the significant number of COSEWIC and/or SARA listed species I would suggest sending this to Mark Simpson as well for his input. Find below my responses to the main questions as per the scope cited above.

I have highlighted in yellow parts that will require Andry and Sebastien's comments/advice (Andry, Sebastien, see also highlighted parts in annex attached).

Regards,

Dounia

From: Meade, James

Sent: June-01-18 2:20 PM

To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith

Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects: The methodologies followed regarding baseline assessments in term of AAR requirements followed the guidelines. I have highlighted a few points in the environmental study (LGL 2018b) that I will share with Andry and Sebastien for their expert opinion. This has to do with the appropriateness of the current data collected (i.e. representability of overall oceanographic conditions) for an adequate modelling of deposition through DEPOMOD. Their comments are more informed than mine

and should be important within that context. I have one concern regarding low DO in the Rushoon BMA (especially that the low DO was collected at 3 meters) in the table attached (word). Considering the lower documented tolerance of triploids to hypoxia, size of fish, important stocking numbers etc this would be a risk that might require attention in term of mortality potential of salmon in the summer. This environmental risk might require additional comments from the proponent.

- The mitigation measures proposed by the proponent: Mitigation measures described by the proponent are fairly standard similarly as the evaluation of environmental risks (pertaining to the following point). The knowledge gaps in term of chemical dispersion/accumulation in hard-bottom dominated cold environments preclude further comments considering the absence of data and/or predictions. Environmental cumulative effects could be further assessed (see my comments in the document) by adding a few sampling points between BMAs though limitations in access might be an issue (depths) and are not required through DFO established regulatory processes but could be considered.
- The level of certainty in the conclusions reached by the proponent on the effects: similarly to my previous points, conclusions in term of cumulative effects are hard to make and any text related to that would be speculative. Regarding benthic effects at the site level they are in agreement with actual knowledge of the area. I will let Andry and Sebastien bring further perspective on DEPOMOD predictions and subsequent conclusions.
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions); as per the AAR methodologies, techniques are adequate for baseline assessments however considering when cage will be stocked (a few years) and timing of surveys I would refer to the RAMO representative (Chris Hendry) to inform on guidelines for baseline data acquisition timing/validity.
- The follow-up program proposed by the proponent; (see above note on in between BMAs point sampling surveys)
- Whether additional information is required from the proponent to complete the review. (see points above + a few comments in the document)

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade
Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
Fisheries and Oceans Canada / Pêches et Océans Canada
80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1
Tel: (709) 772-3332
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E-mail / Courriel: James.Meade@dfo-mpo.gc.ca<mailto:James.Meade@dfo-mpo.gc.ca>

Section #

Section Title

Specific Subsections

Relevant Science Section to review/ provide advice

2.4.

Project Description

2.4.1.1.

2.4.2.2.

Aquaculture

Aquaculture

2.5.

Sea Cage Sites

2.5.2.

Aquaculture/ Salmonids?

2.7.

Alternatives

2.7.3.

Aquaculture

2.8.

Accidents and Malfunctions

2.8.1.

2.8.2.

2.8.3.

Aquaculture/ Salmonids

3.3.

Valued Environmental Components

3.3.2.

Salmonids

4.2.

Aquatic Existing Environment

4.2.1.

4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4

4.2.3.

4.2.4.

Aquaculture or Oceanography?

Ecological Sciences

Salmonids

4.8.

Data Gaps

4.8.1.

4.8.2.

Ecological Sciences

Salmonids

7.0.

Effects of the Project on the Environment

7.2.

Salmonids

7.6.

Cumulative Effects

7.6.4.

7.6.5.2.

Aquaculture/ Salmonids

Salmonids

7.7.

Accidents

7.7.1.

Salmonids/ Aquaculture

7.8.

Follow-up Monitoring

7.8.1.

7.8.2.

Aquaculture/ Salmonids

Aquaculture/ Salmonids

7.9.

Assessment Summary and Conclusions

7.9.1.2.

7.9.1.6.

7.9.2.

7.9.3.

Salmonids

Salmonids/ Aquaculture

Salmonids/ Aquaculture

Salmonids/ Aquaculture

8.0.

Environmental Protection

Aquaculture/ Salmonids

Component Study: Wild Atlantic Salmon + Appendices

Salmonids/ Aquaculture

Johnson, Roger

From: Johnson, Roger
Sent: Tuesday, June 19, 2018 10:13 AM
To: Kelly, Jason
Cc: Pilgrim, Bret
Subject: Grieg

Was just checking in with Jim – all science responses are back except Salmonids which he expects today. His draft document will be ready for “us” Friday. I will review this draft document next week when I am on the road. Jim will be having a meeting with the science reviewers early next week. The final version of the science document will be available the next Friday – 2 days late but as I will have a draft before then this is quite acceptable.

I will be checking in with the other sectors early this week.

Has any thought been given to a communications plan for this project/response?

BTW this project is to be included in the Science Branch “tab 10” issues report today (not real sure what that means)

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Abbott, Melissa H

From: Johnson, Roger
Sent: Tuesday, June 19, 2018 10:38 AM
To: Abbott, Melissa H
Subject: Grieg

Just wondering how things were going with this file.

If there is anything I can do for you please do not hesitate to ask.

I did notice that on Page 175 (page counter in pdf not document page number) – main text that “serious security breeches will be handled by Fisheries Officers” – this sounds a little odd – perhaps it is just me.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Norman, Leslie

From: Norman, Leslie
Sent: June-19-18 11:40 AM
To: Johnson, Roger
Cc: Paul Glavine; Wiseman, Wanda
Subject: RE: Grieg Aquaculture

Hi Roger,

Paul Glavine is doing the review. I shared your earlier remarks with him.

Thanks,

Leslie Norman
Policy and Economic Analyst
Department of Fisheries & Oceans
P.O. Box 5667
St. John's, NL A1C 5X1
(W) 709-772-2500

From: Johnson, Roger
Sent: June-19-18 11:17 AM
To: Norman, Leslie
Subject: Grieg Aquaculture

Just wondering how your review of this project is going.

If there is anything I can do to help out please do not hesitate to contact me.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Kelly, Jason

From: Kelly, Jason
Sent: June-19-18 1:36 PM
To: Johnson, Roger
Subject: RE: Grieg Science Request

Yes. Whwere too

From: Johnson, Roger
Sent: June-19-18 1:34 PM
To: Kelly, Jason
Subject: FW: Grieg Science Request

Got a few minutes ?

From: Richards, Dale E
Sent: Tuesday, June 19, 2018 12:41 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: Grieg Science Request

Hi Roger,

Would you be able to let me know when I might catch you in your office? I wanted to drop by for a few minutes to discuss the Grieg request.

Thanks,
Dale

E. Dale Richards, B.Sc. Hons., M.Sc.
Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
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Visit the Canadian Science Advisory Secretariat of DFO / Visitez le Secrétariat Canadien de Consultation Scientifique du MPO

<http://www.dfo-mpo.gc.ca/csas-sccs/>

s.16(2)(c)

Richards, Dale E

De: Duggan, Charmaine
Envoyé: June-19-18 2:42 PM
À: Ryan, Patricia
Cc: Drover, Florence; McCallum, Barry; Boudreau, Carol-Ann
Objet: Tab 10 & 11 - Upcoming Issues and Decisions - Upcoming Science Publications (Look Ahead Planning Binder)
Pièces jointes: A/RDG NL REgion Approval - Tab 11 - Science Publications and Important Meetings; FOR APPROVAL - Tab11 Science Publications and Important Meetings.pdf; SECRET - Tab 11 - Upcoming Science Publications.docx
Importance: Haute

Good day

Attached is the approved TAB 11 for Science Branch NL region.

Please contact me if you have any questions.

Take care

Charmaine

Charmaine Duggan
Science Branch
NL Region
709-772-2029



Newfoundland & Labrador Region

TRANSMITTAL SLIP

DOCKET/FILE NO: For Approval

SUBJECT: Tab 11 Science Publications and Important Meetings

Initial to indicate approval.

	Name	Tel.	Date	Initial
Originator	J. Meade	3332	19 June 2018	JM.
CSA Coordinator	D. Richards	8892	19 June 2018	DR.
A/Director, Science Branch	A. Mansour	4133	June 19/ 2018	A.M.
Regional Director, Ecosystems Management	R. Finn	2442	2018-06-18	RF
Regional Director General	J. Perry	4117		

COMMENT

Submission for the Tab 11 Science Publications and Important Meetings (Look Ahead Planning Binder): Regional Science Response Process: Grieg NL-Placentia Bay Atlantic Salmon Aquaculture Project. CSAS Meeting June 25th, St. John's, NL.

TAB 11 - UPCOMING SCIENCE PUBLICATIONS AND IMPORTANT MEETINGS

UNCLASSIFIED

#	DFO PUBLICATION TITLE	ANTICIPATED DATE OF RELEASE	DESCRIPTION / PURPOSE	REGION	EXTERNAL PARTICIPANTS	COMMUNICATIONS APPROACH (IF NEEDED)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
#	EXTERNAL PUBLICATION TITLE	ANTICIPATED DATE OF RELEASE	DESCRIPTION / PURPOSE	REGION	EXTERNAL PARTICIPANTS	COMMUNICATIONS APPROACH (IF NEEDED)
1						
#	MEETING TITLE	MEETING DATES AND LOCATION	DESCRIPTION / PURPOSE	REGION	PARTICIPANTS	COMMUNICATIONS APPROACH (IF NEEDED)

1	<p>Canadian Science Advisory Secretariat (CSAS) Regional Science Response Process: Grieg NL-Placentia Bay Atlantic Salmon Aquaculture Project</p>	<p>June 25, Northwest Atlantic Fisheries Centre, St. John's, NL</p>	<p>Grieg NL Nurseries Ltd. and Grieg NL Seafoods Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon in Marystown, NL, and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.</p> <p>On May 30, 2018, the Fisheries Protection Program (FPP) requested that DFO Science undertake a review of specific sections of the EIS for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.</p> <p>Science Branch has initiated a CSAS Science Response Process (SRP) for this review, with a peer review meeting planned for Monday, June 25. The information from this scientific review will be provided to FPP to help form part of the Departmental response to the overall adequacy of the EIS documents.</p>	<p>NL</p>	<p>Science and FPP, NL Region</p>	<p>A CSAS Science Response Report detailing the Science Branch review of the EIS for the proposed project will be published on the CSAS website, in the weeks following the SRP.</p> <p>There is much public interest regarding this project, in particular: the use of European-origin triploid salmon; marine versus land-based aquaculture; a cage system not previously used in the NL Region; and potential farmed salmon/ wild Atlantic Salmon interactions.</p> <p>Communications NL have been contacted and reactive media lines will be developed.</p>
---	---	--	---	------------------	--	---

Kelly, Jason

From: Kelly, Jason
Sent: June-19-18 2:58 PM
To: Richards, Dale E
Subject: RE: Grieg Science Request

On my way

From: Richards, Dale E
Sent: June-19-18 2:57 PM
To: Kelly, Jason
Subject: RE: Grieg Science Request

No problem. I am just back to my desk and will be here until 5ish or in the immediate area.

From: Kelly, Jason
Sent: June-19-18 2:05 PM
To: Richards, Dale E
Subject: RE: Grieg Science Request

I'll drop up to your office, hard to chat in the 2.0 environment

jason

From: Richards, Dale E
Sent: June-19-18 2:03 PM
To: Kelly, Jason
Subject: RE: Grieg Science Request

No problem Jason. I have a meeting in groundfish at 2 pm, so I can drop by your desk around 3 pm. Might that be okay?

From: Kelly, Jason
Sent: June-19-18 1:54 PM
To: Richards, Dale E
Subject: RE: Grieg Science Request

Hi Dale, do you have a couple minutes that I can pop up and have a chat.

Jason

From: Richards, Dale E
Sent: Tuesday, June 19, 2018 12:41 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: Grieg Science Request

Hi Roger,

Would you be able to let me know when I might catch you in your office? I wanted to drop by for a few minutes to discuss the Grieg request.

Thanks,
Dale

E. Dale Richards, B.Sc. Hons., M.Sc.

Centre for Science Advice / Centre des avis scientifiques

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<http://www.dfo-mpo.gc.ca/csas-sccs/>

s.16(2)(c)

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-19-18 3:40 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Subject: PBASAP_EIS_Public Concerns Table
Attachments: EIS_public concern table_19Jun18.doc

Public comments from the EIS review are slow to come in, which is understandable considering the amount of information to digest. I've developed the attached Public Concerns Table from the comments that have been submitted to date, and I'd appreciate it if you would provide comments in the "EAC Comments" column where your initials appear. All committee members are welcome to contribute to the "EAC Comments" column in response to any public submission. I won't attach a deadline for providing your comments, but you may want to respond to these few now before the anticipated onslaught of public comments.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

"This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender."

COMMENTS AND CONCERNS – up to June 14			
1. Effects of Sea Ice and Weather on the Project			
<ul style="list-style-type: none"> The EIS has no plan to deal with pack ice. Are the proponent and the government turning a blind eye to the potential effects of pack ice on the project? The proponent has not considered the weather / sea conditions that can be experienced at the proposed sea cage locations. The tides and storm surges in this bay are of astronomical proportion. These “open pens” will never hold up to the weather. 	Volume 1 Section 4.2.2 - 4.2.2.7 Section 6 Volume 3 CS 1 A Section 4.5	Pg. 142-152 Pg. 350-353 Pg. 18-26	Chris, Carole, Jonathan, Blair
2. Employment			
<ul style="list-style-type: none"> How many jobs will there be once the project is operational? Only low paying jobs available to locals. Are a few short term jobs on the south coast worth the long term risks of wiping out our wild Atlantic salmon stocks? (2) 	Volume 1 Section 4.7	Pg. 321-343	
3. Open Net Pens Should be Banned in Favour of Land-Based Aquaculture or other Alternatives			
<ul style="list-style-type: none"> Open net pens have adverse effects on surrounding marine life and have been banned in other parts of the world. Why aren't they banned here? 4 Right now Norway is using two 	Volume 1 Section 2.7.3.4	Pg. 116-118	Chris, Jonathan

Best available copy

types of salmon farms: land- based and ship shape cages which are totally enclosed ships. Why can't we choose this option?				
<ul style="list-style-type: none"> All salmon farming should be land-based to avoid the impacts of disease and parasites on wild fish and the marine environment.³ I will vote against any government who supports open water salmon pens. 				
4. Effects of Salmon Farms on Wild Atlantic Salmon and Other Species in Nearby Rivers.				
<ul style="list-style-type: none"> The environmental effects of the project on the Sea Run Brook trout fishery in Placentia Bay have not been considered. Can diseases from these fish be spread to this native species? There has never been a "cage" salmon farm that has not had an adverse effect on adjacent river salmon populations. Salmon farms have a devastating effect on wild Atlantic salmon stocks. 	<p>Volume 1 Section 4.2</p> <p>Section 7.0-7.3</p> <p>Section 8</p> <p>Volume 3 CS 1 A Section 4.1-4.4</p>	<p>Pg. 173-192</p> <p>Pg. 354-403</p> <p>Pg. 482-486</p> <p>Pg. 3-17</p>		Carole, Blair, Daryl, Chris, Jonathan
5. Effects of Administering Therapeutants, Pesticides, and Disinfectants at Sea Cage Sites on Wild Atlantic Salmon and Other				

Fish Species.			
<ul style="list-style-type: none"> The antibiotics and chemicals that are going to be dumped into our bay to fend off sea lice and infections will harm our wild Atlantic salmon stocks and other species such as halibut, lobsters & pelagic species. Stop using toxins to control sea lice and save our wild salmon. 	Volume 1 Section 8 Volume 3 CS 1A Section 4.8.3 – 4.8.5	Pg. 482-486 Pg. 47-53	Daryl, Allison
6. Effects of Administering Therapeutants, Pesticides, and Disinfectants at Sea Cage Sites on Farmed Salmon and Cleaner Fish			
<ul style="list-style-type: none"> Mechanical De-licing Results in Increased Injury and Death in Treated Farmed Fish. 			Daryl
7. Effects of Sea Cage Deposits (excess feed and feces) on the Ocean Bed Beneath the Sea Cages			
<ul style="list-style-type: none"> The dead zones beneath these pens will cause a lot of harm to the environment. The tonnes of feces and wasted feed around sea-cages will trigger toxic algae blooms. 	Volume 1 Section 7.1 Section 7.1.2.3 Volume 3 CS 1A Section 4.8.6	Pg. 356 Pg. 363-365 Pg. 53-55	Chris, Jonathan
8. Human Health Risks Associated with Eating Farmed Salmon			
<ul style="list-style-type: none"> Salmon from open net pens are one of the most toxic foods you can eat. (2) 			Allison

<ul style="list-style-type: none"> Public health advises people not to consume a lot of farmed salmon. Eating farmed salmon isn't as healthy as eating wild salmon. 				
9. Effects of Farmed Salmon Escapes on Wild Atlantic Stocks				
<ul style="list-style-type: none"> The farmed salmon escapes will pass on diseases to the wild salmon and result in catastrophic losses of the wild salmon stocks. 	Volume 1 Section 7.7.1 – 7.7.2 Volume 3 CS 1A Section 4.8.1	Pg. 431-466 Pg. 38-46	Daryl, Blair, Carole	
10. Effects of the Project on Recreational and Commercial Fisheries				
<ul style="list-style-type: none"> Locating these pens in areas where fishermen catch fish and make a living to feed their families will be devastating to the fishermen. 	Volume 1 Section 4.4.1 – 4.4.2	Pg. 205-263	John A.	
11. Tax Dollars Should Not be Used to Support the Project				
<ul style="list-style-type: none"> I don't want my tax dollars to contribute to the possible destruction of our natural salmon stocks. 				
12. The Amount of Time for the Public Review Period is Insufficient.(1)				
13. Effects of Using Lump Fish (Cleaner Fish) as Natural De-licing Agents fro Farmed Salmon				
<ul style="list-style-type: none"> Production and husbandry of 			Daryl	

lumpfish results in new health and welfare challenges. The majority of prescriptions for antibiotic treatment in farmed fish in Norway in 2015 were prescribed for treatment of cleaner fish.			
EIS GROUP COMMENTS AND CONCERNS			
NL-CAR (comments and concerns noted above are not repeated in this section)			
NLOA (comments and concerns noted above are not repeated in this section)			
FFAW-UNIFOR (comments and concerns noted above are not repeated			

in this section)				
SCNL (comments and concerns noted above are not repeated in this section)				
SAEN (comments and concerns noted above are not repeated in this section)				
NL Wildlife Federation (comments and concerns noted above are not repeated in this section)				
Port au Port Bay Fishery Committee (comments and concerns noted above are not repeated in this section)				

Qalipu First Nation (comments and concerns noted above are not repeated in this section)				
Gerry Rogers, MHA St. John's Central (comments and concerns noted above are not repeated in this section)				

Meade, James

From: Donnet, Sebastien G
Sent: June-20-18 12:05 PM
To: Meade, James
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

no problem. It is, in fact, in Appendix A or Appendix B or the Fish Habitat component; which appears not searchable via Adobe reader. Section 2.4, p8 (of 28).

Ref:
Ma, Z., Han, G., & de Young, B. (2012). Modelling Temperature, Currents and Stratification in Placentia Bay. Atmosphere-Ocean, 50(3), 244-260

Last thought, hopefully, please have: "These past observations should be stated to put modeling results and limitations in perspective." instead of "At the very least, these past observations should be stated to put modeling results and limitations in perspective."

cheers.

Sebastien

From: Meade, James
Sent: 2018-June-20 11:56
To: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Sebastien,
Thanks for this.

Working on your comments today and wondering if you can provide me the source (Page #?) of the comment re: 1,124 kg/cage/day feed input. Scanned Appendix B but could not see it
Also, could you provide the authorship for Reference: Modelling Temperature, Currents and Stratification in Placentia Bay, Atmosphere-Ocean 50:3, 244-260, DOI: 10.1080/07055900.2012.677413

Cheers,
Jim

From: Donnet, Sebastien G
Sent: June-19-18 10:41 AM
To: Meade, James; Ratsimandresy, Andry
Subject: RE: Request for advice Grieg Aquaculture

Hey Jim,

To soften a little my comments regarding the modeling pitfall and provide some avenue for improvement and/or corrections (if it comes to impose that); feel free to change the wording depending whether we want to impose re-work or not (see the highlight):

Major revisions of Appendix B of Fish and Fish Habitat component (AMEC report) -general comment:-

The ocean current timeseries used for this study are too short to give statistically robust estimates of dispersion. Looping a few days timeseries on itself to make it a month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the of Fish and Fish Habitat component says that tides are a minor component of the total variability (~15%); indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents power spectrum (<0.5 cycles per day or less; Schillinger et al. 2000); indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). At the very least, these past observations should be stated to put modeling results and limitations in perspective. Longer timeseries could/should be used to represent this large variability. One possible avenue would be to use the current fields published by Ma et al. (2012). While their timeseries does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

What is the basis of 1,124 kg/cage/day feed input? Is it the maximum load (worst case scenario as requested by AAR) or something-else?

Reference: Modelling Temperature, Currents and Stratification in Placentia Bay, Atmosphere-Ocean 50:3, 244-260, DOI: 10.1080/07055900.2012.677413

-----Original Message-----

From: Meade, James
Sent: 2018-June-19 08:14
To: Donnet, Sebastien G; Ratsimandresy, Andry
Subject: RE: Request for advice Grieg Aquaculture

Thank you Gents,
I really appreciate your review and comments.

Cheers,
Jim

-----Original Message-----

From: Ratsimandresy, Andry
Sent: June-19-18 6:12 AM
To: Meade, James
Cc: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

Just wanted to add important points with respect to the deposition model:

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such the current data to be used to force the model should correspond to the same period as the planned season for high feeding. Besides the fact that the timeseries are too short, they were collected during winter time and would not correspond to that period.

_ The proponent states that

Page 49. "Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."

However, only measurements at one point for each BMA are reported making the above an overstatement as far as selection of location based on currents and direction.

From: Donnet, Sebastien G

Sent: June 18, 2018 9:43 PM

To: Meade, James

Cc: Ratsimandresy, Andry

Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

here below are my notes, sorry to do that by email but having trouble attaching a file via webmail from home (wont do it), so here it is. Main issue is on the dispersion modeling which uses, though the modelers had not much choices, too short of currents timeseries to hope being statistically representative. Same observation than Andry. We could propose some suggestions though (e.g. Ma et al. 2012 model results). Another point of importance, I think, is on the logistics proposed and the idea of BMAs which appears somewhat in conflict to me (cross-contamination issue). I have not been able to check the provincial official BMAs guidelines by lack of time. In fact, I did not review the whole document either due to time constrain; I could only start my review today and below is all I got:

Major revisions (main text):

"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination." (p. xxix). It is unclear how this will be achieved since some of the proposed routes cross BMAs as Figure 2.52 and 2.53 shows. Petit Forte harbour deserves Rushoon, Merasheen and Red Island BMAs; almost all of them that is. Specific areas for embarkation/ disembarkation within a given BMA are not sufficient as pathogen could be present in most of that given BMA and could be transmitted to another BMA. In fact, this proposed logistics seems to go against the whole idea/purpose of BMAs. p. 98 says: "Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." but they would use routes crossing BMAs as well as shown in Figure 2.53; thus not really mitigating risk of cross-contamination (same argument/problem than for the crew change sites).

"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)" (p xxxiv); we strongly disagree. Currents data used are way too short to determine dominant forcing (e.g. tide vs. wind) and variability. One would need a minimum of 1 month (30 days) for the tides to be determined with reasonable accuracy and on the order of a year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, "siting of sea cages at locations with suitable currents and depth to distribute organic waste", repeated a number of times within the document and used as an argument for most of the VEC potential effects being "not significant" is not proven (demonstrated) by this document/study.

"Data gaps, particularly those related to wild Atlantic salmon migration routes and the degree of ecological interaction between wild salmon and escaped farmed salmon, limit the confidence in some effects predictions." (p. x1). In our view, the physical environment knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged, mentioned and addressed. Water structure seasonality, i.e. temperature and salinity, is not shown either (adequate temperature data were collected, however, so gap is largely on salinity).

"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." (p. 99). While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to that potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to show if this could be an issue or not.

"In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality." p99 is a misleading statement, one only need 1 strong winter to get into trouble. A good example is the 2014 winter which significantly impacted the industry present in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. e.g. do we expect temperature to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the region (Newfoundland shelf)?

"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." p100-101. These data would be highly valuable to, and should be communicated to, regulators. Common understanding of SOPs should also be planned and achieved between the proponent and regulator to ensure data quality.

Section 4.1.2.3 Wind Speed and Direction: while the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc. (threshold to be determined upon structure tolerance). Wind direction variability (seasonality) is also not sufficiently documented (see comments below about Appendix D/V).

Section 4.1.2.4 Climate Change: should provide with more information regarding to future change in storm frequency and intensity as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014; Recent Arctic amplification and extreme mid-latitude weather, Nature Geoscience, DOI: 10.1038/NGEO2234). These are of importance to aquaculture and would better inform risk factors. Note: list of citations regarding this aspect in Appendix V (Oceans Ltd Metocean report), section 2.7.1, is short and somewhat outdated (latest reference is from 2008).

Section 4.2.2.2 Ocean Currents, p143-144. This section completely fails to describe the variability of the currents that have been observed and modelled over the years; likely to be the most important point. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012; Modelling Temperature, Currents and Stratification in Placentia Bay, Atmosphere-Ocean 50:3, 244-260, DOI: 10.1080/07055900.2012.677413) is not even referenced! Appendix D (V) from Oceans Ltd states "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important." This must be clearly stated in the main text since it implies a statistical variability of the currents much greater than that of the, more easily known, one of the tide alone. With tide only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle); in this case, longer timeseries would be necessary to be representative. Wind forcing and the Labrador Current are variable on timescale of days to seasons; implying the need for long timeseries. Clearly, the data collected for this study by DHI and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications with the modeling results presented in section and detailed in Appendix B of the Fish and Fish Habitat component (Volume 3).

Section 4.2.2.3 Wind and Wave Action: due to its nature the MSC50 dataset (NOTE: source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on (created from) a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay) and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. At the very least, comparison with available data should be documented, limitations should be clearly stated and description on how this uncertainty is being mitigated should be provided.

Section 4.2.3.2 Project Area: subzero, shown in Table 4.10, temperature can be lethal to salmon. This paragraph should indicate whether this is considered as a concern or not.

Section 6.8: "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification." The timeseries shown in section 4.2.2.2 and collected for this project are way too short to state something like that. This statement is also not quantitative what-so-ever. What is meant by "adequate"?

Section 7.1.2.3 Deposition from the Sea Cages: due to the severe limitations of the ocean current timeseries, i.e. they are way too short, the estimated benthic loading of carbon given in this section cannot really be trusted (see comments below on Appendix B/AMEC report).

Major revisions of Appendix B of Fish and Fish Habitat component (AMEC) -general comment:-

The ocean current timeseries used for this study are way too short to give statistically robust estimates of dispersion. Looping a few days timeseries on itself to make it a month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the of Fish and Fish Habitat component says that tides are a minor component of the total variability (~15%); indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents power spectrum (<0.5 cycles per day or less; Schillinger et al. 2000); indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). Longer timeseries should be used to represent this large variability.

What is the basis of 1,124 kg/cage/day feed input? Is it the maximum load (worst case scenario), median or something-else?

Major revisions of Appendix V [=Appendix D of Fish and Fish Habitat component; Oceans Ltd Metocean study]:

Section 2.3: this section does not properly describe the wind forcing seasonality. i.e. prevailing directions potentially changing seasonally, as stated in the text. Monthly wind roses should be added to illustrate it.

p.28 "The positive phase of the NAO index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track." Should indicate the resulting effect on the ocean/water column as described in (for instance) Colbourne et al. 2017 (Colbourne, E., Holden, J., Snook, S., Han, G., Lewis, S., Senciall, D., Bailey, W., Higdon, J., and Chen, N. 2017. Physical oceanographic conditions on the Newfoundland and Labrador Shelf during 2016 - Erratum. DFO Can. Sci. Advis. Sec. Res. Doc. 2017/079. v + 50 p.)

Section 3.1, p36: "Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters." this statement is too simplistic and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically,

that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest in Ma et al. 2012 show a radically different pattern (Figure 9 of their paper). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. In addition, the report does not show that wind is “predominately from the southwest during all seasons”, only an annual wind rose is provided (Figure 2.2) which does not justify such a statement. The text of section 2.3 in fact states “There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter.”

Section 3.2: due to its nature the MSC50 dataset (NOTE: source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on (created from) a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay) and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. At the very least, comparison with available data should be documented, limitations should be clearly stated and description on how this uncertainty is being mitigated should be provided. Which dataset were used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Section 3.4: more recent papers on surge in the study area should be cited. e.g. Ma et al. 2017 (Modelling the response of Placentia Bay to hurricanes Igor and Leslie, Ocean Modelling 112 (2017) 112–124).

Minor revisions (main document):

Section 3.5 Data Gaps section, p129, does not identify nor list the gaps nor does it indicate where in the document would those gaps identified/documentated.

Section 3.7.4.3 Duration and Frequency of Effects, p133, categories can be simplified as:

- <1 month -12 months: short-term
- 13-72 months: medium-term
- >72 months: long-term

Section 4.1.1 Overview, p138: Appendix V appears to be labeled as Appendix D of Fish and Fish Habitat component

Section 4.1.2.3 Wind Speed and Direction, p140: wind rose(s) should be added to illustrate the statement “The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer.” Sentence “The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter.” is unclear.

p141 “A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period.” A reference should be provided for this statement.

Section 4.2.2.4 Flood and Tidal Zones: “During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.” Appendix V indicates a surge of 0.93 m in p67.

4.2.3.1 Study Area Overview, Figure 4.6 and Figure 4.7. Standard deviations should be indicated to illustrate the variability.

Section 6.5: "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." Correlation could not be found in LGL 2018b.

Minor revisions (Appendix V):

Appendix V general comment: all stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). Quality of the maps is also pretty poor and blurry and would benefit from a higher resolution.

Appendix V, section 3.1 p36 "In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay. " need to indicate reference here and elsewhere such statement are being made. Other example is "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."

Appendix V, section 3.1.1 Data Sources: please provide reference to the dataset that have already been documented. e.g. MUN data are as data reports (Hart et al 1999; Schillinger et al. 2000)

Appendix V, section 3.1.1 Data Sources: I believe that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be check and text modified if this is the case.

Appendix V, section 3.1.2 "At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20m." It is highly dubious that currents would consistently flow consistently in the same direction anywhere in the bay. Its long term mean, vector-averaged, might be. It is also very unclear where this info was taken (reference? Mooring name?). Text need to be checked and corrected accordingly.

Appendix V, section 2.1.1: MSC50 dataset is not correctly referenced/cited (Swail et al 2006).

From: Meade, James
Sent: Monday, June 18, 2018 11:38 AM
To: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

No worries,
Working on other comments; didn't expect yours until COB so all good!

Thanks and Cheers,
Jim

From: Donnet, Sebastien G
Sent: June-18-18 1:07 PM
To: Meade, James
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

still on it, likely be end of day before I send something.
sorry

Sebastien

From: Meade, James
Sent: 2018-June-13 11:05
To: Donnet, Sebastien G; Ratsimandresy, Andry
Subject: RE: Request for advice Grieg Aquaculture

Excellent-thanks guys!!

From: Donnet, Sebastien G
Sent: June-13-18 11:04 AM
To: Ratsimandresy, Andry; Meade, James
Subject: RE: Request for advice Grieg Aquaculture

ok. Monday will do.

From: Ratsimandresy, Andry
Sent: 2018-June-13 09:46
To: Meade, James
Cc: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Thanks Jim.

Andry

From: Meade, James
Sent: 2018-June-13 9:45 AM
To: Ratsimandresy, Andry
Subject: RE: Request for advice Grieg Aquaculture

COB Monday? Tuesday noon would be the absolute latest.

Thx,
Jim

From: Ratsimandresy, Andry
Sent: June-13-18 9:39 AM
To: Meade, James
Cc: Donnet, Sebastien G
Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

We, Sebastien and myself, are in the process of reviewing the oceanographic part of the request. As Sebastien is out of the office this week, could we submit our review to you early next week?

Thanks,

Andry

From: Meade, James

Sent: 2018-June-09 9:11 AM

To: Hamoutene, Dounia

Cc: Ratsimandresy, Andry; Donnet, Sebastien G

Subject: RE: Request for advice Grieg Aquaculture

Hi Dounia,

Thanks for this - your review, and quick turnaround are greatly appreciated!

I plan to go through your comments today and tomorrow and hope to be in touch very early in the week should I have any questions.

Cheers,

Jim

From: Hamoutene, Dounia

Sent: June-07-18 2:45 PM

To: Meade, James

Cc: Ratsimandresy, Andry; Donnet, Sebastien G

Subject: RE: Request for advice Grieg Aquaculture

Hi Jim,

Unfortunately I do not have time to spend in more than a quick review of the document (which is considering the size of the docs easier said than done). I have made a few comments in the main text and you have to indicate to me how I can share it with you. I have limited my comments to the benthic deposition aspects of the project although I could contribute to the farmed-wild interactions (not only salmon-salmon) as well I have limited the scope of my advice in light of the little time I have. In addition, Carole and her staff will provide ample information on wild salmonids and Keith and his crew on EBSAs and other ecosystem considerations. Considering the significant number of COSEWIC and/or SARA listed species I would suggest sending this to Mark Simpson as well for his input. Find below my responses to the main questions as per the scope cited above.

I have highlighted in yellow parts that will require Andry and Sebastien's comments/advice (Andry, Sebastien, see also highlighted parts in annex attached).

Regards,

Dounia

From: Meade, James

Sent: June-01-18 2:20 PM

To: Grant, Carole; Hamoutene, Dounia; Clarke, Keith

Subject: FW: Request for advice Grieg Aquaculture

Hi Folks,

As discussed with each of you already, the CSA Office has received from FPP the following request for Science Advice:

DFO, as a participant in the Provincial Environmental Assessment for the Placentia Bay Atlantic Salmon Aquaculture Project by Grieg NL, has received the EIS for this project.

The EIS, including the appendices and component studies, can be found at:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html (Note-SCROLL TO "EIS: Main Text")

DFO will provide expert advice on the assessment of impacts and mitigations relative to fish and fish habitat, fisheries resources, species at risk, and sensitive areas, in accordance with a request from the Province of NL.

The table below highlights the specific sections of the EIS that require Science Branch advice and the last column highlights the relevant Science Section to review report section (confusing I know!!)

In particular, please try to focus your comments based on the following criteria:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects: The methodologies followed regarding baseline assessments in term of AAR requirements followed the guidelines. I have highlighted a few points in the environmental study (LGL 2018b) that I will share with Andry and Sebastien for their expert opinion. This has to do with the appropriateness of the current data collected (i.e. representability of overall oceanographic conditions) for an adequate modelling of deposition through DEPOMOD. Their comments are more informed than mine and should be important within that context. I have one concern regarding low DO in the Rushoon BMA (especially that the low DO was collected at 3 meters) in the table attached (word). Considering the lower documented tolerance of triploids to hypoxia, size of fish, important stocking numbers etc this would be a risk that might require attention in term of mortality potential of salmon in the summer. This environmental risk might require additional comments from the proponent.
- The mitigation measures proposed by the proponent: Mitigation measures described by the proponent are fairly standard similarly as the evaluation of environmental risks (pertaining to the following point). The knowledge gaps in term of chemical dispersion/accumulation in hard-bottom dominated cold environments preclude further comments considering the absence of data and/or predictions. Environmental cumulative effects could be further assessed (see my comments in the document) by adding a few sampling points between BMAs though limitations in access might be an issue (depths) and are not required through DFO established regulatory processes but could be considered.
- The level of certainty in the conclusions reached by the proponent on the effects: similarly to my previous points, conclusions in term of cumulative effects are hard to make and any text related to that would be speculative. Regarding benthic effects at the site level they are in agreement with actual knowledge of the area. I will let Andry and Sebastien bring further perspective on DEPOMOD predictions and subsequent conclusions.
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions); as per the AAR methodologies, techniques are adequate for baseline assessments however considering when cage will be stocked (a few years) and timing of surveys I would refer to the RAMO representative (Chris Hendry) to inform on guidelines for baseline data acquisition timing/validity.
- The follow-up program proposed by the proponent; (see above note on in between BMAs point sampling surveys)
- Whether additional information is required from the proponent to complete the review. (see points above + a few comments in the document)

The deadline for submission of comments to the CSA Office is Friday, June 15, 2018, in order to facilitate the Science Response Process.

If you have any questions or concerns, please do not hesitate to contact me.

Thanks and Cheers,
Jim

James D. Meade
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Section #

Section Title

Specific Subsections

Relevant Science Section to review/ provide advice

2.4.

Project Description

2.4.1.1.

2.4.2.2.

Aquaculture

Aquaculture

2.5.

Sea Cage Sites

2.5.2.

Aquaculture/ Salmonids?

2.7.

Alternatives

2.7.3.

Aquaculture

2.8.

Accidents and Malfunctions

2.8.1.

2.8.2.

2.8.3.

Aquaculture/ Salmonids

3.3.

Valued Environmental Components

3.3.2.

Salmonids

4.2.

Aquatic Existing Environment

4.2.1.

4.2.2. - 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.2.4

4.2.3.

4.2.4.

Aquaculture or Oceanography?

Ecological Sciences

Salmonids

4.8.

Data Gaps

4.8.1.

4.8.2.

Ecological Sciences

Salmonids

7.0.

Effects of the Project on the Environment

7.2.

Salmonids

7.6.

Cumulative Effects

7.6.4.

7.6.5.2.

Aquaculture/ Salmonids

Salmonids

7.7.

Accidents

7.7.1.

Salmonids/ Aquaculture

7.8.

Follow-up Monitoring

7.8.1.

7.8.2.

Aquaculture/ Salmonids

Aquaculture/ Salmonids

7.9.

Assessment Summary and Conclusions

7.9.1.2.

7.9.1.6.

7.9.2.

7.9.3.

Salmonids

Salmonids/ Aquaculture

Salmonids/ Aquaculture

Salmonids/ Aquaculture

8.0.

Environmental Protection

Aquaculture/ Salmonids

Component Study: Wild Atlantic Salmon + Appendices

Salmonids/ Aquaculture

Meade, James

From: Grant, Carole
Sent: June-20-18 2:10 PM
To: Meade, James
Subject: Salmonids comments - EIS
Attachments: Greig Aquaculture EIS.docx

Hi Jim,

As discussed, attached are comments on the Grieg Aquaculture from Salmonids. I'm continuing my review and will provide additional comments as I complete them. Hopefully send you something by mid-day tomorrow.

Carole

General Comments

1. Repeatedly throughout the document there are missing citations to key literature and inaccurate statements.
2. Risk and uncertainty consistently under represented. DFO Science assessment of the risks associated with the proposed expansion identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps the report consistently states that there is medium to high certainty of non-significant impacts. This is unlikely.
3. Data on triploidy induction improvements lacking in document. The EIS (and Appendix I) states that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this CANNOT be validated. Without validation the reported 98% success rate seems a more reasonable approximation.
4. The proportion of triploids may change during development. There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, which would dramatically increase the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

Executive Summary

Sea Cage Sites

p. xxx – It states that all sea cages will be attended by an ROV and operator in addition to a camera monitoring above and below the water surface. Does this mean each cage will be equipped with its own ROV and operator? What frequency will the ROV monitor the cages? Daily?

Assessment Boundaries

p. xxxi – It states that the boundaries of the Study Area are the Placentia Bay Extension EBSA and that this is considered the 'maximum extent' wherein potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where we would expect most adverse effects to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon

are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Genetic Integrity and Biological Fitness of Wild Atlantic Salmon

p. xxxiv – Provide supporting documentation to demonstrate how 100% triploidy will be achieved.

p. xxxiv – Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, not more than 50 km away. And several of the proposed cage locations are at the mouths of known salmon rivers. Should show salmon rivers (both scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away.

p. xxxiv – The data for 100% triploidy induction with no error will have to be shown and peer reviewed.

Control of Sea Lice

p. xxxiv – Explain how proposed mitigative measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.

Effects on Benthic Habitat

p. xxxiv – Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province back then.

Fish and Fish Habitat VEC

p. xxxv – It states that there will be cessation of feeding at ~80% satiation. I assume this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation? This is very subjective and would require constant monitoring of the fish's behaviour.

Wild Atlantic Salmon VEC

p. xxxvi – I assume it isn't necessary to provide references in Executive Summaries? If it is, need to provide reference for Placentia Bay salmon abundance estimate.

p. xxxvi – Studies exist for migratory movements on south coast. Refer to 1) Reddin, D.G. and W.H. Lear. 1990. Summary of marine tagging studies of Atlantic salmon (*Salmo salar*) in the Northwest Atlantic. Can. Tech. Rep. Fish. Aquat. Sci. 1737: 115 and 2) Pippy, J. 1992. Report of the working group on the interception of mainland salmon in Newfoundland. Can. Manus. Rep. Fish. Aquat. Sci. St. John's, NL, Fisheries and Oceans Canada.

p. xxxvii – 1st para, it states that effects are expected '*to be minor, localized and relatively short-term*'. This is not known and the statement does reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Species at Risk VEC

p. xxxvii – There's no mention of the footprint that will be caused by deposition of organic wastes.

Sensitive Areas VEC

p. xxxviii – I assume the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed?

Accidents and Malfunctions

p. xxxix – Provide references to support the statement that triploid female salmon do not enter freshwater.

Follow-up Monitoring

p. xxxix – Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Summary of Component Studies

p. xli – Follow-up monitoring doesn't minimize potential effects; should use similar wording as used below for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

2.0. Proposed Undertaking

2.4.1 Project Rationale

p. 11 - The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay.

And although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US, notwithstanding potential impacts it could have on local fisheries resources, particularly Atlantic salmon.

2.4.1.1 – Rationale for using European-strain Triploid salmon

p. 12-18 - Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Several examples are provided where small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, it would have been helpful to see the proportional contribution of triploids versus diploids for each of these example companies. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids? Hence, information pertaining to what proportion of farmed salmon production comes from triploids would help place this in context.

The recent status report on wild Atlantic salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Status of wild Atlantic salmon in Norway 2017. Eva Thorstad and Torbjorn Forseth). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The EIS suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

P. 14-15 of the EIS states that despite previous concerns triploid salmon perform equal or better than diploids. This is encouraging, but until triploids are fully investigated in Newfoundland – Placentia Bay, there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *“In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay”* is premature. While the study is now somewhat dated, triploid rainbow trout were not found to perform better than diploids at Bay d’Espoir (Pepper et al. 2003).

2.4.4.1 Rationale for Proposing European-strain Sterile triploid Atlantic Salmon

p.17 – In the executive Summary (p. xxxix), it states that *‘triploid female salmon do not enter freshwater’*, however, it states here that the *‘propensity for triploid Atlantic salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic salmon escapes’*.

2.4.2.2 Marine

p.21 – Would be useful to label any scheduled rivers on these maps to show proximity to sea cage sites/sea cages.

2.4.3.2 Operations and Maintenance

p. 29 – What percentage of the eyed eggs will be tested and certified for diseases, sterility and all-female prior to being shipped to NL?

2.4.4 Sea Farms

p. 45 – Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of “clients” were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. This is because there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, suggesting these nets are not commonly used, yet.

P. 45 – It states that Greig NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. Sea lice skirts have worked well in some areas (e.g. Scotland), but other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012).

p.52 – There’s reference to service vessels assisting with net changing. Are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions?

p.53 – It states that ‘*typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...*’. Does this mean all nets are replaced approximately every year?

2.4.4.2 Operations and Maintenance

p.64 – It states that a transfer of fish between sea cages may be required and if so a response/corrective action will be developed as per the established SOP, which would likely involve the use of well boats. Please clarify under what circumstances a transfer between sea cages would be required and there should be a commitment to use well boats for this purpose as Greig NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

p. 68 – Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? What about transfer of pathogens/disease from lumpfish to salmon?

Fully expect sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted above, sea lice are a major threat to wild salmon in Norway.

p. 73 – It states that environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated. This should be explained further.

2.4.4.3 Decommissioning and Rehabilitation

p. 81 – It states that an assessment of the seafloor beneath the sea cage sites will be carried out and appropriate remediation measures will be implemented. What sort of remediation measures would be carried out on the seafloor?

2.5.2.2 Operations and Maintenance

Fish Escape

p. 90 – Under inspections, it states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *‘typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...’*.

P.92 –What are the contents of an escape response kit?

Genetic Integrity and Biological Fitness of Wild Atlantic salmon

1. p.96 – The following statement *‘the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites’* exceeding DFO’s own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they’re non-scheduled). These non-scheduled rivers are totally missing from the EIS:

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary’s Bay

**In St. Mary’s Bay

Pathogen/Parasite Transfer between Farmed and Wild Atlantic salmon

p. 101 - Use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic salmon. The CFIA web site indicates the

following ISA events reported for Newfoundland: 2012 – 3, 2014 – 4, 2017 – 2, 2018 – 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

2.7.3 – Alternatives within the project

p. 111 – There is reference to Bay St. George and the Codroy valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of MSW salmon in these rivers.

3.6.2.2 Study Area

p. 130 – It states that *'the boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA'* and that *'this is considered the maximum extent wherein'* potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where we would expect most adverse effects to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species.

4.2.2.1 Location of Rivers

p. 143 – It states that *'the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site'*, whereas earlier in the EIS it states that *'the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites'* (see p. 96).

Species Profiles

p. 166 –There is no mention of the threatened designation for lumpfish from COSEWIC in November 2017.

4.2.4 Wild Atlantic salmon

p.173 - The EIS acknowledges the COSEWIC evaluation on the status of Atlantic salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also clearly indicated that with respect to South Newfoundland, had the analysis extended back just one (1) single year (i.e. over 16 years), South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador. A retrospective analysis of salmon returns to Conne River for the years 1976 – 1985 (10 year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 years of the fish counting fence operation (1986 – 1989) (Robertson et al. 2013). Indeed, the recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995).

Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence.

4.2.4.3 Migratory Patterns

P. 174 – Remove reference to Atlantic salmon only spending '*several months*' in their natal freshwater habitat after hatching as they always spend at least one year or more.

P. 175 - 1st para, it states that '*Atlantic salmon migratory corridors in Placentia Bay have not been identified in the literature*' yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area while recently genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay. Refer to references below:

Bradbury et al. 2016. Genetic mixed stock analysis of an interceptor Atlantic salmon fishery in the Northwest Atlantic. Fisheries Research 174: 234-244.

Reddin, D.G. and W.H. Lear. 1990. Summary of Marine Tagging Studies of Atlantic Salmon (*Salmo salar* L.) in the Northwest Atlantic. Canadian Technical Report Fisheries and Aquatic Sciences 1737:115.

Pippy, J. 1982. Report of the working group on the interception of mainland salmon in Newfoundland. In Canadian Manuscript Report of Fisheries and Aquatic Sciences. St. John's, Nfld: Fisheries and Oceans Canada.

4.2.4.4 Genetic Population Structure

P. 175 – 2nd para, update text to reflect that no diploid escapes were found in 2017 either.

p. 175 – Genetic structure discussion is weak and missing several references (see below). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic salmon, making them highly vulnerable to impacts.

Jeffery, N.W. , B.F. Wringe, M. McBride, L.C. Hamilton, R.R.E. Stanley, L. Bernatchez, P. Bentzen, R.G. Beiko, M. Clément, J. Gilbey, T.F. Sheehan, and I.R. Bradbury. 2018. Range-wide regional assignment of Atlantic salmon (*Salmo salar*) using genome wide single-nucleotide polymorphisms. Fisheries Research.

Bradbury, Ian R., Lorraine C. Hamilton, Brian Dempson, Martha J. Robertson, Vincent Bourret, Louis Bernatchez, and Eric Verspoor. 2015. Transatlantic secondary contact in Atlantic Salmon, comparing

microsatellites, a single nucleotide polymorphism array and restriction-site associated DNA sequencing for the resolution of complex spatial structure. *Molecular Ecology* 24 (20):5130-5144.

4.2.4.5 Abundance

P. 176 - It notes that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by ICES, "is potentially quite risky".

6.5 – Superchill

P. 351 - Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

6.9 Algal blooms

P. 352 - The EIS refers to the potential for toxic algal blooms but state that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, just recently Greig salmon farms in British Columbia lost 250,000 salmon owing to toxic algae.

7.1 Fish and Fish Habitat VEC

p.354 - There's no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat? This should be discussed under operations and maintenance.

7.1.2.2 Presence of Farmed Salmon

p. 362 – Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, the EIS doesn't discuss how this could subsequently increase mortality on migrating wild smolts and adults.

p. 361-362 - Indirect genetic effects and ecological interactions are not adequately described nor is the potential effects of escapees on wild Atlantic salmon populations.

7.1.2.5 Maintenance of Sea Cages

p. 369 – Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies to use of monitoring on p. 370 under presence of sea cages.

7.2 Wild salmon VEC

p. 372 - There's no mention of potential escapes of farmed fish as an effect of the project on wild salmon? This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

p. 377 – Comments raised above regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7.1.1 Fish Escape – Emergency Scenario

p. 434 – It states that '*Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit*'. It would be useful for the reader if these other attributes were described. It also states that '*since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon*'. There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic salmon.

p. 435 – 2nd para, it states that '*Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon*', however, this will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. This is an overstatement. It also references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, however, the reader has no idea whether approximately the same number of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

p. 435 – Last para, there is a reference provided whereby it states that *'even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence'*, yet escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% full-proof.

p. 435 – 3rd para, it states that *'it has been documented that farmed Atlantic salmon escapes, in this case diploids, **sometimes** enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon'*. The word *'sometimes'* should be replaced with *'commonly'*.

p. 435 – 3rd para, Keyser et al. was NOT conducted in Norway, but Atlantic Canada.

p. 436 – 1st para, there is a reference provided by Verspoor et al, which states that *'smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks'*. It is important to point out that a lot of the salmon rivers on the south coast of Newfoundland have low abundances.

p. 436 - 1st para, references missing. Conclusions based on microsatellites. Additional text needed. In fact, there are more genetic differences detected among populations in southern Newfoundland than elsewhere in the province, so the statement is incorrect.

p. 436 – 3rd para, the EIS seems to be mixing up juvenile and adult surveys, also “older individuals” is not correct. These were later stage hybrids. All individuals were young of the year. Also, update that there were no escapes captured in Fortune Bay or Bay D’Espoir in 2017 either. Interestingly enough though, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

7.8.2 Accidental Events

p. 476 – Again it mentions sampling would involve collecting and analyzing blood samples. Any monitoring of impacts would likely be undertaken by DFO in collaboration with Greig NL.

7.9.1.2 Wild salmon VEC

p. 478 - The EIS states that: *'Overall, planned Project activities on the WS VEC were predicted to be not significant'*.

While the proponent has outlined in detail the various mitigation measures that will be taken, many of which are to be commended, a more realistic conclusion could be the following:

Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic salmon and wild populations of Atlantic salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.

7.9.2 Accidents and Malfunctions

p. 480 – It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it has to be low.

7.9.3 Conclusions

p. 481 – It seems unlikely the effects will be non-significant.

The following references should be considered for inclusion in EIS:

Dempson, J. B. et al. 2006. Stock status summary for Atlantic salmon from Newfoundland and Labrador. Canadian Science Advisory Secretariat Research Document 2006/028, 38 pp.

O'Connell, M. F. 2003. An examination of the use of angling data to estimate total returns of Atlantic salmon, *Salmo salar*, to two rivers in Newfoundland, Canada. Fisheries Management and Ecology 10: 201 – 208.

Pepper, V.A. et al. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502, 53 p.

Pippy, J. 1982. Report of the working group on the interception of mainland salmon in Newfoundland. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1654.

Powell, A. et al. 2017. Use of lumpfish for sea-lice control in salmon farming: challenges and opportunities. Reviews in Aquaculture doi: 10.1111/raq.12194.

Robertson, M. J. et al. 2013. Population viability analysis for the South Newfoundland Atlantic salmon (*Salmo salar*) designatable unit. Canadian Science Advisory Secretariat Research Document 2013/090. 26 pp.

Stien, L. H. 2012. Skirt around a salmon sea cage to reduce infestation of sea lice resulted in low oxygen levels. Aquacultural Engineering 51: 21-25.

Thorstad, E. B. et al. 2008. Incidence and impacts of escaped farmed Atlantic salmon *Salmo salar* in nature. NINA Special Report 36, 110 pp.

Warren, W. G. And J. B. Dempson. 1995. Does temporal stratification improve the accuracy of mark-recapture estimates of smolt production? A case study based on the Conne River, Newfoundland. North American Journal of Fisheries Management 15: 126-136.

Appendix I

EIS cites improved triploidy induction method but data are not shown nor does it appear to be published. As a result it is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed, (i.e., 100% or high rates of failure). Again data is not shown.

Abbott, Melissa H

From: Morris, Robyn
Sent: Wednesday, June 20, 2018 3:03 PM
To: Abbott, Melissa H
Subject: RE: Grieg Aquaculture
Attachments: Request to FAM BBP_RM.docx

Also attached is this in Word.

Comments:

2.8 Lost/Estranged gear

- p.123: Although "much of the gear would likely remain in place", a worst-case scenario may assume that *none* of the gear would remain.
- What estranged/entangled gear with respect to marine mammals. What regulations will be used

4.4.2.3 Domestic Fisheries in the Study Area

- p.208: The statement "currently there is a shift back to a groundfish-based fishery (Fig. 4.17)." This statement is not clear from figure referenced. It's recommended to add other supporting literature.
- P.224: to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); to what magnitude?
- p.227: "The TAC is divided evenly for harvesters north of 46°30'M ...". Is this an IQ fishery? Should it be included if so?
- p. 228 "...and quota adjustments in areas that show a flux in population demographics." This statement could be clarified,
- p.237: with respect to gear modification for salmon bycatch: what are the regulatory measures with respect to bycatch of salmon? What data, if any, is there on salmon bycatch?
- P.243: (first sentence) DFO also has a New Emerging Species Policy with similar objectives as DFLR which can be captured.
- p.244: regarding DFO RV study. It may be useful to describe the RV study itself. "No RV catch locations during this period were within 10km of proposed cage sites." This is misleading because of the structure of the RV survey (random stratified); so it may not necessarily mean there was no catch, it may just mean that no survey went within 10km of cage, and therefore no catch would have been recorded.

4.4.2.4 Aquaculture

- p.251: Are there any recent data for primary product value for musclev post 2007.

4.4.2.6 Indigenous Fisheries

- p.258: second sentence: there are 5* indigenous groups with communal commercial licences. MAMKA is **not** an indigenous group- it is an AAROM (Aboriginal Aquatic Resource and Oceans Management) body.
- Give content to the location of these groups- Nunatsiavut, NCC, and Innu are all in Labrador and are unlikely to harvest communally commercially in 3Ps.

Robyn Morris

Regional FM Officer
Fisheries Resource Management

Phone: (709) 772.8859
e-mail: robyn.morris@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Monday, June 18, 2018 9:27 AM
To: Morris, Robyn <Robyn.Morris@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

That is good lol

Melissa Abbott
A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Morris, Robyn
Sent: Monday, June 18, 2018 9:27 AM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

We can yep, but I haven't gotten to read through the sections yet.

Robyn Morris
Regional FM Officer
Fisheries Resource Management
Phone: (709) 772.8859
e-mail: robyn.morris@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Monday, June 18, 2018 9:26 AM
To: Morris, Robyn <Robyn.Morris@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Maybe we could chat about this....

Melissa Abbott
A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Friday, June 15, 2018 2:28 PM
To: Morris, Robyn <Robyn.Morris@dfo-mpo.gc.ca>
Cc: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Subject: Fw: Grieg Aquaculture

Fyi

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Sent: Thursday, May 31, 2018 11:16 AM
To: Simms, Jason; Coffin, David (David.Coffin@dfo-mpo.gc.ca); Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in your Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

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Robyn Morris Comments

Section #	Section Title	Specific Subsections
2.8	Accidents and Malfunctions	2.8.5.

Lost/Estranged gear

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White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-20-18 4:27 PM
To: Hanchar, Dorothea; Ficzer, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Squires, Susan
Subject: FW: aquaculture questions

Please see Allison's email below. I'll ask Jonathan and Chris to take the lead on the response, and other committee members are welcome to comment.

Please let me know if you have any concerns.

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

From: Denning, Allison (HC/SC) <allison.denning@canada.ca>
Sent: Wednesday, June 20, 2018 3:53 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Subject: aquaculture questions

Hi Joanne – I have a couple of questions related to aquaculture practices in NL –

- 1) Are there any departments that are concerned with the detritus including feces and any chemicals (e.g. antibiotics) in the unconsumed feed that may end up on the bottom of the ocean and accumulate over time? I've seen side-scan sonar images of the ocean floor under net pens in New Brunswick and there was definitely a footprint beneath the net pens. This type of nutrient-rich environment can lead to the development of bacteria (I heard the term super-bugs) – but also bring other species around which may consume this material. Thinking about human consumption of these species (e.g. lobster, crabs, etc.) – is there any concern related to uptake of chemicals in non-targeted species?
- 2) I have seen aquaculture projects where the operators clean equipment using disinfectants between sites to minimize the risk of bringing contaminants or parasites from one site to another – however, they would dump the spent disinfectant directly into the ocean – and depending on the disinfectant (I wrote an ecological toxicity report on an iodophor compound when I worked for Environment Canada) – there may be toxicity to non-target organisms due to direct discharge – are there any departments monitoring the use and discharge of disinfectants into the marine environment? Are other departments concerned with this practice?
- 3) Has noise (i.e. people complaining about noise) ever been an issue? E.g. idling of boats near recreational areas or cabins, noise from automated feeders etc. – I have seen comments on aquaculture projects in Nova Scotia which were located close to the shoreline where people were very concerned about noise
- 4) In some projects I have seen, it is not so much about the list of substances they say will be used – it is the off-label use of substances than can have adverse environmental impacts (e.g. New Brunswick I believe they used cypermethrin to control sea lice and it is not approved for marine use) and a bunch of lobsters died (as they are giant but tasty sea bugs) – has there been any concerns in NL with off-label use of chemicals at aquaculture facilities?

I may have additional general questions related to aquaculture and will send them to you shortly –

Thanks!

Allison

“This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender.”

No information has been removed or severed from this page

Meade, James

From: Grant, Carole
Sent: June-21-18 7:32 AM
To: Meade, James
Subject: Greig Aquaculture EIS - Salmonids Comments
Attachments: Greig Aquaculture EIS.docx

Jim,

Please disregard the earlier version of the comments I sent you and replace with the attached.

I'm currently working through the Wild Atlantic Salmon Component Study and will send you comments on this soon, bearing in mind that a lot of the comments in this document have already been provided because much of this information is also contained in the main body of the EIS.

If you have any questions or wish to discuss, please let me know.

I will be working from home this morning, but plan on coming in to the office after lunch. If you need to call me at home my number is [REDACTED] or you can try my cell at [REDACTED]

Carole

s.16(2)(c)

s.19(1)

General Comments

1. Repeatedly throughout the document there are missing citations to key literature and inaccurate statements.
2. Risk and uncertainty consistently under represented. DFO Science assessment of the risks associated with the proposed expansion identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps the report consistently states that there is medium to high certainty of non-significant impacts. This is unlikely.
3. Data on triploidy induction improvements lacking in document. The EIS (and Appendix I) states that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this CANNOT be validated. Without validation the reported 98% success rate seems a more reasonable approximation.
4. The proportion of triploids may change during development. There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, which would dramatically increase the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

Executive Summary

Sea Cage Sites

p. xxx – It states that all sea cages will be attended by an ROV and operator in addition to a camera monitoring above and below the water surface. Does this mean each cage will be equipped with its own ROV and operator? What frequency will the ROV monitor the cages? Daily?

Assessment Boundaries

p. xxxi – It states that the boundaries of the Study Area are the Placentia Bay Extension EBSA and that this is considered the 'maximum extent' wherein potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where we would expect most adverse effects to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon

are caught within the bay. Therefore, it seems inaccurate to state that the '*maximum extent*' for impacts is the EBSA.

Genetic Integrity and Biological Fitness of Wild Atlantic Salmon

p. xxxiv – Provide supporting documentation to demonstrate how 100% triploidy will be achieved.

p. xxxiv – Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are <30 km from the proposed cage sites, not >50 km away. And several of the proposed cage locations are at the mouths of known salmon rivers. Should show salmon rivers (both scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away.

p. xxxiv – The data for 100% triploidy induction with no error will have to be shown and peer reviewed.

Control of Sea Lice

p. xxxiv – Explain how proposed mitigative measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.

Effects on Benthic Habitat

p. xxxiv – Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province back then.

Fish and Fish Habitat VEC

p. xxxv – It states that there will be cessation of feeding at ~80% satiation. I assume this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation? This is very subjective and would require constant monitoring of the fish's behaviour.

Wild Atlantic Salmon VEC

p. xxxvi – I assume it isn't necessary to provide references in Executive Summaries? If it is, need to provide reference for Placentia Bay salmon abundance estimate.

p. xxxvi – Studies exist for migratory movements on south coast. Refer to 1) Reddin, D.G. and W.H. Lear. 1990. Summary of marine tagging studies of Atlantic salmon (*Salmo salar*) in the Northwest Atlantic. Can. Tech. Rep. Fish. Aquat. Sci. 1737: 115 and 2) Pippy, J. 1992. Report of the working group on the interception of mainland salmon in Newfoundland. Can. Manus. Rep. Fish. Aquat. Sci. St. John's, NL, Fisheries and Oceans Canada.

p. xxxvii – 1st para, it states that effects are expected '*to be minor, localized and relatively short-term*'. This is not known and the statement does reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Species at Risk VEC

p. xxxvii – There's no mention of the footprint that will be caused by deposition of organic wastes.

Sensitive Areas VEC

p. xxxviii – I assume the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed?

Accidents and Malfunctions

p. xxxix – Provide references to support the statement that triploid female salmon do not enter freshwater.

Follow-up Monitoring

p. xxxix – Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Summary of Component Studies

p. xli – Follow-up monitoring doesn't minimize potential effects; should use similar wording as used below for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

2.0. Proposed Undertaking

2.4.1 Project Rationale

p. 11 - The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay.

And although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US, notwithstanding potential impacts it could have on local fisheries resources, particularly Atlantic salmon.

2.4.1.1 – Rationale for using European-strain Triploid salmon

p. 12-18 - Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Several examples are provided where small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, it would have been helpful to see the proportional contribution of triploids versus diploids for each of these example companies. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids? Hence, information pertaining to what proportion of farmed salmon production comes from triploids would help place this in context.

The recent status report on wild Atlantic salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Status of wild Atlantic salmon in Norway 2017. Eva Thorstad and Torbjorn Forseth). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The EIS suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

P. 14-15 of the EIS states that despite previous concerns triploid salmon perform equal or better than diploids. This is encouraging, but until triploids are fully investigated in Newfoundland – Placentia Bay, there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *“In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay”* is premature. While the study is now somewhat dated, triploid rainbow trout were not found to perform better than diploids at Bay d’Espoir (Pepper et al. 2003).

2.4.4.1 Rationale for Proposing European-strain Sterile triploid Atlantic Salmon

p.17 – In the executive Summary (p. xxxix), it states that *‘triploid female salmon do not enter freshwater’*, however, it states here that the *‘propensity for triploid Atlantic salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic salmon escapes’*.

2.4.2.2 Marine

p.21 – Would be useful to label any scheduled rivers on these maps to show proximity to sea cage sites/sea cages.

2.4.3.2 Operations and Maintenance

p. 29 – What percentage of the eyed eggs will be tested and certified for diseases, sterility and all-female prior to being shipped to NL?

2.4.4 Sea Farms

p. 45 – Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of “clients” were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. This is because there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, suggesting these nets are not commonly used, yet.

P. 45 – It states that Greig NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. Sea lice skirts have worked well in some areas (e.g. Scotland), but other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012).

p.52 – There’s reference to service vessels assisting with net changing. Are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions?

p.53 – It states that *‘typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...’*. Does this mean all nets are replaced approximately every year?

2.4.4.2 Operations and Maintenance

p.64 – It states that a transfer of fish between sea cages may be required and if so a response/corrective action will be developed as per the established SOP, which would likely involve the use of well boats. Please clarify under what circumstances a transfer between sea cages would be required and there should be a commitment to use well boats for this purpose as Greig NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

p. 68 – Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? What about transfer of pathogens/disease from lumpfish to salmon?

Fully expect sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted above, sea lice are a major threat to wild salmon in Norway.

p. 73 – It states that environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated. This should be explained further.

2.4.4.3 Decommissioning and Rehabilitation

p. 81 – It states that an assessment of the seafloor beneath the sea cage sites will be carried out and appropriate remediation measures will be implemented. What sort of remediation measures would be carried out on the seafloor?

2.5.2.2 Operations and Maintenance

Fish Escape

p. 90 – Under inspections, it states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *'typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...'*.

P.92 –What are the contents of an escape response kit?

Genetic Integrity and Biological Fitness of Wild Atlantic salmon

1. p.96 – The following statement *'the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites'* exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they're non-scheduled). These non-scheduled rivers are totally missing from the EIS:

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Pathogen/Parasite Transfer between Farmed and Wild Atlantic salmon

p. 101 - Use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic salmon. The CFIA web site indicates the

following ISA events reported for Newfoundland: 2012 – 3, 2014 – 4, 2017 – 2, 2018 – 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

2.7.3 – Alternatives within the project

p. 111 – There is reference to Bay St. George and the Codroy valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of MSW salmon in these rivers.

3.6.2.2 Study Area

p. 130 – It states that *'the boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA'* and that *'this is considered the maximum extent wherein'* potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where we would expect most adverse effects to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species.

4.2.2.1 Location of Rivers

p. 143 – It states that *'the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site'*, whereas earlier in the EIS it states that *'the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites'* (see p. 96).

Species Profiles

p. 166 – There is no mention of the threatened designation for lumpfish from COSEWIC in November 2017.

4.2.4 Wild Atlantic salmon

p.173 - The EIS acknowledges the COSEWIC evaluation on the status of Atlantic salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also clearly indicated that with respect to South Newfoundland, had the analysis extended back just one (1) single year (i.e. over 16 years), South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador. A retrospective analysis of salmon returns to Conne River for the years 1976 – 1985 (10 year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 years of the fish counting fence operation (1986 – 1989) (Robertson et al. 2013). Indeed, the recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995).

Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence.

4.2.4.3 Migratory Patterns

P. 174 – Remove reference to Atlantic salmon only spending '*several months*' in their natal freshwater habitat after hatching as they always spend at least one year or more.

P. 175 - 1st para, it states that '*Atlantic salmon migratory corridors in Placentia Bay have not been identified in the literature*' yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area while recently genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay. Refer to references below:

Bradbury et al. 2016. Genetic mixed stock analysis of an interceptor Atlantic salmon fishery in the Northwest Atlantic. Fisheries Research 174: 234-244.

Reddin, D.G. and W.H. Lear. 1990. Summary of Marine Tagging Studies of Atlantic Salmon (*Salmo salar* L.) in the Northwest Atlantic. Canadian Technical Report Fisheries and Aquatic Sciences 1737:115.

Pippy, J. 1982. Report of the working group on the interception of mainland salmon in Newfoundland. In Canadian Manuscript Report of Fisheries and Aquatic Sciences. St. John's, Nfld: Fisheries and Oceans Canada.

4.2.4.4 Genetic Population Structure

P. 175 – 2nd para, update text to reflect that no diploid escapes were found in 2017 either.

p. 175 – Genetic structure discussion is weak and missing several references (see below). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic salmon, making them highly vulnerable to impacts.

Jeffery, N.W. , B.F. Wringe, M. McBride, L.C. Hamilton, R.R.E. Stanley, L. Bernatchez, P. Bentzen, R.G. Beiko, M. Clément, J. Gilbey, T.F. Sheehan, and I.R. Bradbury. 2018. Range-wide regional assignment of Atlantic salmon (*Salmo salar*) using genome wide single-nucleotide polymorphisms. Fisheries Research.

Bradbury, Ian R., Lorraine C. Hamilton, Brian Dempson, Martha J. Robertson, Vincent Bourret, Louis Bernatchez, and Eric Verspoor. 2015. Transatlantic secondary contact in Atlantic Salmon, comparing

microsatellites, a single nucleotide polymorphism array and restriction-site associated DNA sequencing for the resolution of complex spatial structure. *Molecular Ecology* 24 (20):5130-5144.

4.2.4.5 Abundance

P. 176 - It notes that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by ICES, "is potentially quite risky".

6.5 – Superchill

P. 351 - Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

6.9 Algal blooms

P. 352 - The EIS refers to the potential for toxic algal blooms but state that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, just recently Greig salmon farms in British Columbia lost 250,000 salmon owing to toxic algae.

7.1 Fish and Fish Habitat VEC

p.354 - There's no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat? This should be discussed under operations and maintenance.

7.1.2.2 Presence of Farmed Salmon

p. 362 – Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, the EIS doesn't discuss how this could subsequently increase mortality on migrating wild smolts and adults.

p. 361-362 - Indirect genetic effects and ecological interactions are not adequately described nor is the potential effects of escapees on wild Atlantic salmon populations.

7.1.2.5 Maintenance of Sea Cages

p. 369 – Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies to use of monitoring on p. 370 under presence of sea cages.

7.2 Wild salmon VEC

p. 372 - There's no mention of potential escapes of farmed fish as an effect of the project on wild salmon? This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

p. 377 – Comments raised above regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7.1.1 Fish Escape – Emergency Scenario

p. 434 – It states that *'Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit'*. It would be useful for the reader if these other attributes were described. It also states that *'since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon'*. There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic salmon.

p. 435 – 2nd para, it states that *'Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon'*, however, this will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. This is an overstatement. It also references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, however, the reader has no idea whether approximately the same number of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

p. 435 – Last para, there is a reference provided whereby it states that *'even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence'*, yet escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% full-proof.

p. 435 – 3rd para, it states that *'it has been documented that farmed Atlantic salmon escapes, in this case diploids, **sometimes** enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon'*. The word *'sometimes'* should be replaced with *'commonly'*.

p. 435 – 3rd para, Keyser et al. was NOT conducted in Norway, but Atlantic Canada.

p. 436 – 1st para, there is a reference provided by Verspoor et al, which states that *'smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks'*. It is important to point out that a lot of the salmon rivers on the south coast of Newfoundland have low abundances.

p. 436 - 1st para, references missing. Conclusions based on microsatellites. Additional text needed. In fact, there are more genetic differences detected among populations in southern Newfoundland than elsewhere in the province, so the statement is incorrect.

p. 436 – 3rd para, the EIS seems to be mixing up juvenile and adult surveys, also "older individuals" is not correct. These were later stage hybrids. All individuals were young of the year. Also, update that there were no escapes captured in Fortune Bay or Bay D'Espoir in 2017 either. Interestingly enough though, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

p.440 – The statement *'...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon'* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

p.440 – It states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

7.8 Follow-Up Monitoring

p. 475 – Please clarify why the EEMP is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

7.8.2 Accidental Events

p. 476 – Again it mentions sampling would involve collecting and analyzing blood samples. Any monitoring of impacts would likely be undertaken by DFO in collaboration with Greig NL.

7.9.1.2 Wild salmon VEC

p. 478 - The EIS states that: '*Overall, planned Project activities on the WS VEC were predicted to be not significant*'.

While the proponent has outlined in detail the various mitigation measures that will be taken, many of which are to be commended, a more realistic conclusion could be the following:

Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic salmon and wild populations of Atlantic salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

p. 480 – It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it has to be low.

7.9.3 Conclusions

p. 481 – It seems unlikely the effects will be non-significant.

8.1 Summary of Mitigation Measures

Table 8.1 – Under the potential effect '*alter genetic integrity....*', it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Appears to be some inconsistencies throughout the document.

The following references should be considered for inclusion in EIS:

Dempson, J. B. et al. 2006. Stock status summary for Atlantic salmon from Newfoundland and Labrador. Canadian Science Advisory Secretariat Research Document 2006/028, 38 pp.

O'Connell, M. F. 2003. An examination of the use of angling data to estimate total returns of Atlantic salmon, *Salmo salar*, to two rivers in Newfoundland, Canada. *Fisheries Management and Ecology* 10: 201 – 208.

Pepper, V.A. et al. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. *Can. Tech. Rep. Fish. Aquat. Sci.* 2502, 53 p.

Pippy, J. 1982. Report of the working group on the interception of mainland salmon in Newfoundland. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1654.

Powell, A. et al. 2017. Use of lumpfish for sea-lice control in salmon farming: challenges and opportunities. *Reviews in Aquaculture* doi: 10.1111/raq.12194.

Robertson, M. J. et al. 2013. Population viability analysis for the South Newfoundland Atlantic salmon (*Salmo salar*) designatable unit. Canadian Science Advisory Secretariat Research Document 2013/090. 26 pp.

Stien, L. H. 2012. Skirt around a salmon sea cage to reduce infestation of sea lice resulted in low oxygen levels. *Aquacultural Engineering* 51: 21-25.

Thorstad, E. B. et al. 2008. Incidence and impacts of escaped farmed Atlantic salmon *Salmo salar* in nature. NINA Special Report 36, 110 pp.

Warren, W. G. And J. B. Dempson. 1995. Does temporal stratification improve the accuracy of mark-recapture estimates of smolt production? A case study based on the Conne River, Newfoundland. *North American Journal of Fisheries Management* 15: 126-136.

Appendix I – Stofnfiskur Certification and Verification (All-Female Triploid)

EIS cites improved triploidy induction method but data are not shown nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed, (i.e., 100% or high rates of failure). Again data is not shown.

Appendix T – Greig NL Emergency Response Plan

p. 31 - It states that '*if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented*'. I think this should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful mainly because a recapture plan wasn't in place, which resulted in delays in initiating recapture efforts.

p. 32 – 1st para, It states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state 'provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

p. 32 – 2nd para, it is recommended that an emergency licence should already be in place in the event an escape incident arises, so there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid Science to ensure any adverse effects on wild salmon are minimized.

p. 32 - 3rd para, need to specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

p. 32 – 5th para, it states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

p. 32 – 6th para, again there is reference to seeking the assistance of '*third-party providers such as local fishermen*' and engaging in recapture efforts '*as quickly as possible*'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that '*recapture nets will be checked 4 times daily while deployed*'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

p. 33 – last para, Appendix 8 appears to be missing.

Rolls, Elaine

From: Rolls, Elaine
Sent: Thursday, June 21, 2018 9:05 AM
To: Abbott, Melissa H
Subject: RE: Grieg Aquaculture

I will have input today just wanted to let you know.

Elaine Rolls
C&P Supervisor
Fishery Officer / Agent des Pêches
Conservation and Protection / Conservation et Protection
Box 1208, 7 Harris Drive Industrial Park / C.P. 1208 Harris Drive Industriel Parc
Marystown, NL A0E 2M0 / Marystown, Terre Neuve et Labrador A0E 2M0
Tel: (709) 279-7850 or [REDACTED] (cell) Fax / Copieur: (709) 279-7860
Email / Courriel: Elaine.Rolls@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason; Coffin, David; Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in you Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Parrill, Erika

From: Parrill, Erika
Sent: Thursday, June 21, 2018 11:23 AM
To: Richards, Dale E
Cc: Korchoski, Connie
Subject: RE: Contributors to the Grieg SRP

Will do!

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Richards, Dale E
Sent: Thursday, June 21, 2018 11:22 AM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Cc: Korchoski, Connie <Connie.Korchoski@dfo-mpo.gc.ca>
Subject: RE: Contributors to the Grieg SRP

Hi Erika,

Be sure to copy Connie for information purposes, so that she can start to become familiar with our processes and our exchanges with CSAS-NHQ. We will need Connie's assistance this Fall sending these types of meeting requests/invitations.

From: Richards, Dale E
Sent: June-21-18 10:57 AM
To: Parrill, Erika; Meade, James
Subject: RE: Contributors to the Grieg SRP

That would be terrific. Thanks ☺

From: Parrill, Erika
Sent: June-21-18 10:56 AM
To: Meade, James
Cc: Richards, Dale E
Subject: RE: Contributors to the Grieg SRP

Ok you want me to msg Laura to put it on the schedule?

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Meade, James
Sent: Thursday, June 21, 2018 10:51 AM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>

Cc: Richards, Dale E <Dale.Richards2@dfo-mpo.gc.ca>

Subject: RE: Contributors to the Grieg SRP

Also, time to notify NHQ and get it posted to the schedule.

Cheers!

From: Meade, James

Sent: June-21-18 10:50 AM

To: Parrill, Erika

Cc: Richards, Dale E

Subject: Contributors to the Grieg SRP

Here's the list of folks to invite to the meeting Monday afternoon.

FYI - I plan to have the SRR ready to distribute for review tomorrow noon.

Dounia Hamoutene, Andry Ratsimandresy, Sebastien Donnet - Aquaculture

Carole Grant, Ian Bradbury, Brian Dempson – Salmonids

Bob Gregory, Kate Dalley, Cynthia MacKenzie – Ecological Sciences

Roger Johnson, Jason Kelly - FPP

Cheers,

Jim

James D. Meade

Centre for Science Advice / Centre des avis scientifiques

Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador

Fisheries and Oceans Canada / Pêches et Océans Canada

80 East White Hills Road, PO Box 5667, St. John's, NL A1C 5X1

Tel: (709) 772-3332

Fax/ Télécopieur: (709) 772-6100

E-mail / Courriel: James.Meade@dfo-mpo.gc.ca

Meade, James

From: Dempson, Brian
Sent: June-21-18 11:35 AM
To: Grant, Carole
Cc: Meade, James
Subject: RE: Greig Aquaculture EIS - Salmonids Comments
Attachments: 5678 - Thorstad - Status of wild Atlantic salmon in Norway 2017.pdf; 5679- Thorstad - full Norwegian salmon status report 2017.pdf

There were two (2) reports. The full Norwegian status report is written in Norwegian (~152 pages), and they have also produced a smaller English Summary. Both reports are attached - so cite as you wish.

Full Report -

Anon. 2017. Status for norske laksebestander i 2017.
Rapport fra Vitenskapelig råd for lakseforvaltning nr 10, 152 s.

Summary Report -

Status of wild Atlantic salmon in Norway.

Brian

J. Brian Dempson

Fisheries and Oceans Canada
Science Branch
80 East White Hills Road
P. O. Box 5667
St. John's, NL A1C 5X1

Phone: (709) 772-7989 (** NEW Phone # **)
FAX: (709) 772-4188
E-mail: brian.dempson@dfo-mpo.gc.ca

-----Original Message-----

From: Grant, Carole
Sent: 2018-June-21 10:29 AM
To: Dempson, Brian
Cc: Meade, James
Subject: Fw: Greig Aquaculture EIS - Salmonids Comments

Brian,

Would you be able to provide his full reference to Jim please?

Thanks
Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

Original Message

From: Meade, James <James.Meade@dfo-mpo.gc.ca>

Sent: Thursday, June 21, 2018 10:27 AM

To: Grant, Carole

Subject: RE: Greig Aquaculture EIS - Salmonids Comments

Thanks Carole,

FYI- I need this (complete) reference: (Status of wild Atlantic salmon in Norway 2017. Eva Thorstad and Torbjorn Forseth), cited in Section 2.4.1.1.

Thanks and Cheers,
Jim

-----Original Message-----

From: Grant, Carole

Sent: June-21-18 7:32 AM

To: Meade, James

Subject: Greig Aquaculture EIS - Salmonids Comments

Jim,

Please disregard the earlier version of the comments I sent you and replace with the attached.

I'm currently working through the Wild Atlantic Salmon Component Study and will send you comments on this soon, bearing in mind that a lot of the comments in this document have already been provided because much of this information is also contained in the main body of the EIS.

If you have any questions or wish to discuss, please let me know.

I will be working from home this morning, but plan on coming in to the office after lunch. If you need to call me at home my number is [REDACTED] or you can try my cell at [REDACTED]

Carole

s.16(2)(c)

s.19(1)

RAPPORT FRA VITENSKAPELIG RÅD FOR LAKSEFORVALTNING

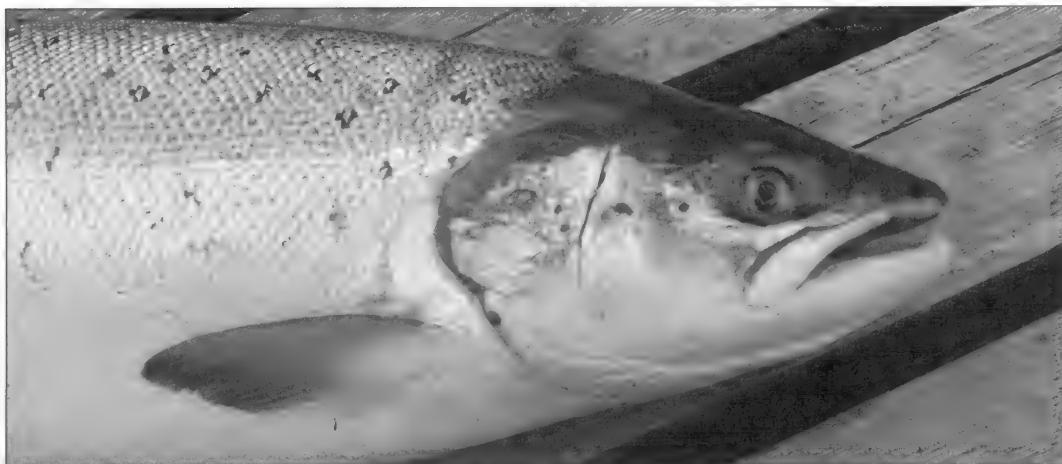
NR 10

Status for norske
laksebestander i 2017



VITENSKAPELIG RÅD
FOR LAKSEFORVALTNING

Status of wild Atlantic salmon in Norway



Norwegian Scientific Advisory Committee for Atlantic Salmon

The status of wild Atlantic salmon in Norway is evaluated annually by the Norwegian Scientific Advisory Committee for Atlantic Salmon. This is an English summary of the work of the committee, mainly based on the annual report of 2017.

The committee is appointed by the Norwegian Environment Agency. The mission of the committee is to evaluate status of salmon and the relative importance of different threat factors, give science-based catch advice and give advice on other subjects related to wild salmon management. The committee only gives advice related to biological questions, and do not consider socio-economic challenges in the management of salmon.

Current members of the committee are 13 scientists from seven different institutes/universities: Torbjørn Forseth (leader), Bjørn T. Barlaup, Sigurd Einum, Bengt Finstad, Peder Fiske, Morten Falkegård, Åse Helen Garseth, Atle Hindar, Tor Atle Mo, Eva B. Thorstad, Kjell Rong Utne, Asbjørn Vøllestad and Vidar Wennevik. The committee is an independent body, and the members do not represent the institutions where they are employed when serving on the committee.

Contact: Torbjørn Forseth (torbjorn.forseth@nina.no), Eva B. Thorstad (eva.thorstad@nina.no), Peder Fiske (peder.fiske@nina.no), or any other member of the committee. www.vitenskapsradet.no



**Pages 283 to / à 290
are withheld pursuant to section
sont retenues en vertu de l'article**

68(a)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Glavine, Paul

From: Glavine, Paul
Sent: June-21-18 11:59 AM
To: Johnson, Roger
Subject: Re: Grieg Aquaculture

Grand. Thanks

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Thursday, June 21, 2018 11:50 AM
To: Glavine, Paul
Subject: RE: Grieg Aquaculture

FAM, Science and EM Aquaculture have all been asked to have a look at it

From: Glavine, Paul
Sent: Thursday, June 21, 2018 11:41 AM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Hi Roger,
Just wondering, is Policy and Economics the only sector reviewing section 4.4 of the EIS?

Thanks.
Paul

From: Johnson, Roger
Sent: May-30-18 2:58 PM
To: Norman, Leslie
Cc: Pilgrim, Bret
Subject: Grieg Aquaculture

As discussed please find attached a request for review of the EIS for the above mentioned project. I have indicated the section that may be of particular interest to your Branch, however if you wish to comment on other sections please feel free to do so.

If you have any questions please feel free to contact me at anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Meade, James

From: Meade, James
Sent: June-21-18 12:05 PM
To: Parrill, Erika
Subject: RE: Last minute addition to schedule

Hi Erika,
Title is: Review of the Environmental Impact Statement for the Placentia Bay Atlantic Salmon Aquaculture Project.
Everything else good to go!

Thanks and Cheers,
Jim

From: Parrill, Erika
Sent: June-21-18 11:23 AM
To: Meade, James
Subject: Last minute addition to schedule
Importance: High

Hey Jim – can you please confirm that the title below is good?

Hey Laura,

Can you please add the following meeting to the CSAS Schedule:

- Title: Review of appropriate sections of the Environmental Impact Statement of Placentia Bay Atlantic Salmon Aquaculture Project
- Type: SRP
- Date: June 25, 2018
- Location: St. John's, NL
- Chair: Dale Richards
- Note: No ToR as it's a SRP

Side note: Dale already made Sophie aware that this process was coming.

Chat soon,
Erika ☺

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Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309

Meade, James

From: Meade, James
Sent: June-21-18 12:11 PM
To: Dempson, Brian; Grant, Carole
Subject: RE: Greig Aquaculture EIS - Salmonids Comments

Excellent!
Thanks Brian

-----Original Message-----

From: Dempson, Brian
Sent: June-21-18 11:35 AM
To: Grant, Carole
Cc: Meade, James
Subject: RE: Greig Aquaculture EIS - Salmonids Comments

There were two (2) reports. The full Norwegian status report is written in Norwegian (~152 pages), and they have also produced a smaller English Summary. Both reports are attached - so cite as you wish.

Full Report -

Anon. 2017. Status for norske laksebestander i 2017.
Rapport fra Vitenskapelig råd for lakseforvaltning nr 10, 152 s.

Summary Report -

Status of wild Atlantic salmon in Norway.

Brian

J. Brian Dempson

Fisheries and Oceans Canada
Science Branch
80 East White Hills Road
P. O. Box 5667
St. John's, NL A1C 5X1

Phone: (709) 772-7989 (** NEW Phone # **)
FAX: (709) 772-4188
E-mail: brian.dempson@dfo-mpo.gc.ca

-----Original Message-----

From: Grant, Carole

Sent: 2018-June-21 10:29 AM
To: Dempson, Brian
Cc: Meade, James
Subject: Fw: Greig Aquaculture EIS - Salmonids Comments

Brian,

Would you be able to provide his full reference to Jim please?

Thanks
Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

Original Message
From: Meade, James <James.Meade@dfo-mpo.gc.ca>
Sent: Thursday, June 21, 2018 10:27 AM
To: Grant, Carole
Subject: RE: Greig Aquaculture EIS - Salmonids Comments

Thanks Carole,
FYI- I need this (complete) reference: (Status of wild Atlantic salmon in Norway 2017. Eva Thorstad and Torbjorn Forseth), cited in Section 2.4.1.1.

Thanks and Cheers,
Jim

-----Original Message-----
From: Grant, Carole
Sent: June-21-18 7:32 AM
To: Meade, James
Subject: Greig Aquaculture EIS - Salmonids Comments

Jim,

Please disregard the earlier version of the comments I sent you and replace with the attached.

I'm currently working through the Wild Atlantic Salmon Component Study and will send you comments on this soon, bearing in mind that a lot of the comments in this document have already been provided because much of this information is also contained in the main body of the EIS.

If you have any questions or wish to discuss, please let me know.

I will be working from home this morning, but plan on coming in to the office after lunch. If you need to call me at home my number is [REDACTED] or you can try my cell at [REDACTED]

Carole

s.16(2)(c)
s.19(1)

Richards, Dale E

De: Parrill, Erika
Envoyé: June-21-18 12:33 PM
À: Richards, Dale E
Objet: Re: CSAS Meeting: Greig EIS

Thank you :)

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Richards, Dale E
Sent: Thursday, June 21, 2018 11:55 AM
To: Parrill, Erika
Subject: RE: CSAS Meeting: Greig EIS

I will talk to Jason after lunch.

From: Parrill, Erika
Sent: June-21-18 11:53 AM
To: Richards, Dale E
Subject: FW: CSAS Meeting: Greig EIS

FYI

><(((°>...><(((°>...><(((°>...><(((°>...><(((°>...><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Kelly, Jason
Sent: Thursday, June 21, 2018 11:51 AM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Cc: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: CSAS Meeting: Greig EIS

Roger will be driving that day, Dale mentioned to me yesterday that we could have him dial in. I would to have that option for Roger

jason

From: Parrill, Erika
Sent: June-21-18 11:49 AM
To: Kelly, Jason
Subject: RE: CSAS Meeting: Greig EIS

Ball, Dave

From: Ball, Dave
Sent: June-21-18 1:45 PM
To: Abbott, Melissa H
Subject: RE: Grieg Aquaculture

I have reviewed, no comments to offer.

Dave

From: Abbott, Melissa H
Sent: June-18-18 9:25 AM
To: Simms, Jason; Coffin, David; Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry; Diamond, Julie
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: RE: Grieg Aquaculture

Hi Folks

A friendly reminder that comments are due June 21 - Thanks

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason <Jason.Simms@dfo-mpo.gc.ca>; Coffin, David (<David.Coffin@dfo-mpo.gc.ca> <David.Coffin@dfo-mpo.gc.ca>; Dunne, Erin <Erin.Dunne@dfo-mpo.gc.ca>; Ball, Dave <Dave.Ball@dfo-mpo.gc.ca>; Penney, Kim <Kimberley.Penney@dfo-mpo.gc.ca>; Hawkins, Laurie <Laurie.Hawkins@dfo-mpo.gc.ca>; Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>
Cc: Burton, Ron <Ron.Burton@dfo-mpo.gc.ca>; Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Rumbolt, Annette <Annette.Rumbolt@dfo-mpo.gc.ca>; Cahill, Paul <Paul.Cahill@dfo-mpo.gc.ca>; Walsh, Ray <Ray.Walsh@dfo-mpo.gc.ca>; Tobin, Derek (Duke) <Derek.Tobin@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in you Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Richards, Dale E

De: Parrill, Erika
Envoyé: June-21-18 2:00 PM
À: Bradbury, Ian R
Cc: Richards, Dale E
Objet: RE: CSAS Meeting: Greig EIS

Hey Ian – I'll set up a WebEx as we're primarily wordsmithing the Science Response and it'll be easier to follow along visually. Details to follow shortly.

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Erika Parrill
Centre for Science Advice – NL Region

From: Bradbury, Ian R
Sent: Thursday, June 21, 2018 1:58 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: RE: CSAS Meeting: Greig EIS

I will not be in the building, webex would be great or I can always call in assuming there is a speaker phone in the room

Thanks

Ian

From: Parrill, Erika
Sent: Thursday, June 21, 2018 1:26 PM
To: Bradbury, Ian R
Subject: RE: CSAS Meeting: Greig EIS

Hey Ian – Will you be in the building or do I need to setup a WebEx for you? ☺

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

-----Original Appointment-----

From: Bradbury, Ian R
Sent: Thursday, June 21, 2018 1:55 PM
To: Parrill, Erika
Subject: Accepted: CSAS Meeting: Greig EIS
When: Monday, June 25, 2018 1:00 PM-3:00 PM (UTC-03:30) Newfoundland.
Where: Memorial Room

Parrill, Erika

From: Parrill, Erika
Sent: Thursday, June 21, 2018 2:26 PM
To: Bradbury, Ian R
Subject: RE: CSAS Meeting: Greig EIS

Just sent you the WebEx invitation. It would have been from James Meade.

-Erika ☺

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Bradbury, Ian R
Sent: Thursday, June 21, 2018 1:58 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: RE: CSAS Meeting: Greig EIS

I will not be in the building, webex would be great or I can always call in assuming there is a speaker phone in the room

Thanks

Ian

From: Parrill, Erika
Sent: Thursday, June 21, 2018 1:26 PM
To: Bradbury, Ian R
Subject: RE: CSAS Meeting: Greig EIS

Hey Ian – Will you be in the building or do I need to setup a WebEx for you? ☺

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

-----Original Appointment-----

From: Bradbury, Ian R
Sent: Thursday, June 21, 2018 1:55 PM
To: Parrill, Erika
Subject: Accepted: CSAS Meeting: Greig EIS
When: Monday, June 25, 2018 1:00 PM-3:00 PM (UTC-03:30) Newfoundland.
Where: Memorial Room

Parrill, Erika

From: Parrill, Erika
Sent: Thursday, June 21, 2018 3:14 PM
To: Kelly, Jason
Subject: RE: CSAS Meeting: Greig EIS

Thanks Jason for letting me know.

Cheers,
Erika

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Erika Parrill
Centre for Science Advice – NL Region

From: Kelly, Jason
Sent: Thursday, June 21, 2018 2:56 PM
To: Richards, Dale E <Dale.Richards2@dfo-mpo.gc.ca>; Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Cc: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: CSAS Meeting: Greig EIS

Roger will be attending in person for FPP

Jason

From: Richards, Dale E
Sent: June-21-18 2:07 PM
To: Kelly, Jason
Subject: RE: CSAS Meeting: Greig EIS

Hi Jason,

I went by your desk a few minutes ago to discuss FPP participation. Can you give me a call or drop by my office.

-----Original Appointment-----

From: Kelly, Jason
Sent: June-21-18 1:24 PM
To: Parrill, Erika
Cc: Johnson, Roger; Richards, Dale E
Subject: Declined: CSAS Meeting: Greig EIS
When: June-25-18 1:00 PM-3:00 PM (UTC-03:30) Newfoundland.
Where: Memorial Room

Erica, unfortunately, I cannot attend as I've had a personal appt come up. I would like to have Roger dial in if possible

jason

No information has been removed or severed from this page

Richards, Dale E

De: Meade, James
Envoyé: June-22-18 7:33 AM
À: Richards, Dale E
Objet: FW: Comments on Greig Aquaculture EIS - Salmonids
Pièces jointes: Greig Aquaculture EIS.docx

FYI-a little past due!!!

-----Original Message-----

From: Grant, Carole
Sent: June-21-18 11:52 PM
To: Meade, James
Cc: Bradbury, Ian R; Dempson, Brian
Subject: Comments on Greig Aquaculture EIS - Salmonids

Jim,

Attached please find final comments from Salmonids on the Greig Aquaculture EIS and Wild Atlantic Salmon Component Study.

If you have any questions, please let me know.

Carole

General Comments

1. Repeatedly throughout the document there are missing citations to key literature and inaccurate statements.
2. Risk and uncertainty consistently under represented. DFO Science assessment of the risks associated with the proposed expansion identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps the report consistently states that there is medium to high certainty of non-significant impacts. This is unlikely.
3. Data on triploidy induction improvements lacking in document. The EIS (and Appendix I) states that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this CANNOT be validated. Without validation the reported 98% success rate seems a more reasonable approximation.
4. The proportion of triploids may change during development. There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, which would dramatically increase the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

Executive Summary

Sea Cage Sites

p. xxx – It states that all sea cages will be attended by an ROV and operator in addition to a camera monitoring above and below the water surface. Does this mean each cage will be equipped with its own ROV and operator? What frequency will the ROV monitor the cages? Daily?

Assessment Boundaries

p. xxxi – It states that the boundaries of the Study Area are the Placentia Bay Extension EBSA and that this is considered the 'maximum extent' wherein potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where we would expect most adverse effects to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon

are caught within the bay. Therefore, it seems inaccurate to state that the '*maximum extent*' for impacts is the EBSA.

Genetic Integrity and Biological Fitness of Wild Atlantic Salmon

p. xxxiv – Provide supporting documentation to demonstrate how 100% triploidy will be achieved.

p. xxxiv – Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are <30 km from the proposed cage sites, not >50 km away. And several of the proposed cage locations are at the mouths of known salmon rivers. Should show salmon rivers (both scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away.

p. xxxiv – The data for 100% triploidy induction with no error will have to be shown and peer reviewed.

Control of Sea Lice

p. xxxiv – Explain how proposed mitigative measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.

Effects on Benthic Habitat

p. xxxiv – Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province back then.

Fish and Fish Habitat VEC

p. xxxv – It states that there will be cessation of feeding at ~80% satiation. I assume this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation? It should be acknowledged that this is very subjective and would require constant monitoring of the fish's behaviour.

Wild Atlantic Salmon VEC

p. xxxvi – I assume it isn't necessary to provide references in Executive Summaries? If it is, need to provide reference for Placentia Bay salmon abundance estimate.

p. xxxvi – Studies exist for migratory movements on south coast. Refer to 1) Reddin, D.G. and W.H. Lear. 1990. Summary of marine tagging studies of Atlantic salmon (*Salmo salar*) in the Northwest Atlantic. Can. Tech. Rep. Fish. Aquat. Sci. 1737: 115 and 2) Pippy, J. 1992. Report of the working group on the interception of mainland salmon in Newfoundland. Can. Manus. Rep. Fish. Aquat. Sci. St. John's, NL, Fisheries and Oceans Canada.

p. xxxvii – 1st para, it states that effects are expected '*to be minor, localized and relatively short-term*'. This is not known and the statement does reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Species at Risk VEC

p. xxxvii – There's no mention of the footprint that will be caused by deposition of organic wastes.

Sensitive Areas VEC

p. xxxviii – I assume the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed?

Accidents and Malfunctions

p. xxxix – Provide references to support the statement that triploid female salmon do not enter freshwater.

Follow-up Monitoring

p. xxxix – Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Summary of Component Studies

p. xli – Follow-up monitoring doesn't minimize potential effects; should use similar wording as used below for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

2.0. Proposed Undertaking

2.4.1 Project Rationale

p. 11 - The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay.

And although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US, notwithstanding potential impacts it could have on local fisheries resources, particularly Atlantic salmon.

2.4.1.1 – Rationale for using European-strain Triploid salmon

p. 12-18 - Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Several examples are provided where small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, it would have been helpful to see the proportional contribution of triploids versus diploids for each of these example companies. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids? Hence, information pertaining to what proportion of farmed salmon production comes from triploids would help place this in context.

The recent status report on wild Atlantic salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Status of wild Atlantic salmon in Norway 2017. Eva Thorstad and Torbjorn Forseth). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The EIS suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

P. 14-15 of the EIS states that despite previous concerns triploid salmon perform equal or better than diploids. This is encouraging, but until triploids are fully investigated in Newfoundland – Placentia Bay, there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. While the study is now somewhat dated, triploid rainbow trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

2.4.4.1 Rationale for Proposing European-strain Sterile triploid Atlantic Salmon

p.17 – In the executive Summary (p. xxxix), it states that *'triploid female salmon do not enter freshwater'*, however, it states here that the *'propensity for triploid Atlantic salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic salmon escapes'*.

2.4.2.2 Marine

p.21 – Would be useful to label any scheduled rivers on these maps to show proximity to sea cage sites/sea cages. This is actually done in Wild Atlantic Salmon Comp Study (see Fig. 4.2).

2.4.3.2 Operations and Maintenance

p. 29 – What percentage of the eyed eggs will be tested and certified for diseases, sterility and all-female prior to being shipped to NL?

2.4.4 Sea Farms

p. 45 – Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of “clients” were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. This is because there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, suggesting these nets are not commonly used, yet.

P. 45 – It states that Greig NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. Sea lice skirts have worked well in some areas (e.g. Scotland), but other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012).

p.52 – There's reference to service vessels assisting with net changing. Are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions?

p.53 – It states that *'typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...'*. Does this mean all nets are replaced approximately every year?

2.4.4.2 Operations and Maintenance

p.64 – It states that a transfer of fish between sea cages may be required and if so a response/corrective action will be developed as per the established SOP, which would likely involve the use of well boats. Please clarify under what circumstances a transfer between sea cages would be required and there should be a commitment to use well boats for this purpose as Greig NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

p. 68 – Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? What about transfer of pathogens/disease from lumpfish to salmon?

Fully expect sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted above, sea lice are a major threat to wild salmon in Norway.

p. 73 – It states that environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated. This should be explained further.

2.4.4.3 Decommissioning and Rehabilitation

p. 81 – It states that an assessment of the seafloor beneath the sea cage sites will be carried out and appropriate remediation measures will be implemented. What sort of remediation measures would be carried out on the seafloor?

2.5.2.2 Operations and Maintenance

Fish Escape

p. 90 – Under inspections, it states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *'typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...'*.

P.92 –What are the contents of an escape response kit?

Genetic Integrity and Biological Fitness of Wild Atlantic salmon

1. p.96 – The following statement *'the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites'* exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they're non-scheduled). These non-scheduled rivers are totally missing from the EIS:

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Pathogen/Parasite Transfer between Farmed and Wild Atlantic salmon

p. 101 - Use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic salmon. The CFIA web site indicates the

following ISA events reported for Newfoundland: 2012 – 3, 2014 – 4, 2017 – 2, 2018 – 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

2.7.3 – Alternatives within the project

p. 111 – There is reference to Bay St. George and the Codroy valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of MSW salmon in these rivers.

3.6.2.2 Study Area

p. 130 – It states that *'the boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA'* and that *'this is considered the maximum extent wherein'* potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where we would expect most adverse effects to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species.

4.2.2.1 Location of Rivers

p. 143 – It states that *'the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site'*, whereas earlier in the EIS it states that *'the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites'* (see p. 96).

Species Profiles

p. 166 – There is no mention of the threatened designation for lumpfish from COSEWIC in November 2017.

4.2.4 Wild Atlantic salmon

p.173 - The EIS acknowledges the COSEWIC evaluation on the status of Atlantic salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also clearly indicated that with respect to South Newfoundland, had the analysis extended back just one (1) single year (i.e. over 16 years), South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador. A retrospective analysis of salmon returns to Conne River for the years 1976 – 1985 (10 year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 years of the fish counting fence operation (1986 – 1989) (Robertson et al. 2013). Indeed, the recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995).

Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence.

4.2.4.3 Migratory Patterns

P. 174 – Remove reference to Atlantic salmon only spending '*several months*' in their natal freshwater habitat after hatching as they always spend at least one year or more.

P. 175 - 1st para, it states that '*Atlantic salmon migratory corridors in Placentia Bay have not been identified in the literature*' yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area while recently genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay. Refer to references below:

Bradbury et al. 2016. Genetic mixed stock analysis of an interceptor Atlantic salmon fishery in the Northwest Atlantic. *Fisheries Research* 174: 234-244.

Reddin, D.G. and W.H. Lear. 1990. Summary of Marine Tagging Studies of Atlantic Salmon (*Salmo salar* L.) in the Northwest Atlantic. Canadian Technical Report Fisheries and Aquatic Sciences 1737:115.

Pippy, J. 1982. Report of the working group on the interception of mainland salmon in Newfoundland. In Canadian Manuscript Report of Fisheries and Aquatic Sciences. St. John's, Nfld: Fisheries and Oceans Canada.

4.2.4.4 Genetic Population Structure

P. 175 – 2nd para, update text to reflect that no diploid escapes were found in 2017 either.

p. 175 – Genetic structure discussion is weak and missing several references (see below). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic salmon, making them highly vulnerable to impacts.

Jeffery, N.W. , B.F. Wringe, M. McBride, L.C. Hamilton, R.R.E. Stanley, L. Bernatchez, P. Bentzen, R.G. Beiko, M. Clément, J. Gilbey, T.F. Sheehan, and I.R. Bradbury. 2018. Range-wide regional assignment of Atlantic salmon (*Salmo salar*) using genome wide single-nucleotide polymorphisms. *Fisheries Research*.

Bradbury, Ian R., Lorraine C. Hamilton, Brian Dempson, Martha J. Robertson, Vincent Bourret, Louis Bernatchez, and Eric Verspoor. 2015. Transatlantic secondary contact in Atlantic Salmon, comparing

microsatellites, a single nucleotide polymorphism array and restriction-site associated DNA sequencing for the resolution of complex spatial structure. *Molecular Ecology* 24 (20):5130-5144.

4.2.4.5 Abundance

P. 176 - It notes that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by ICES, "is potentially quite risky".

6.5 – Superchill

P. 351 - Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

6.9 Algal blooms

P. 352 - The EIS refers to the potential for toxic algal blooms but state that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, just recently Greig salmon farms in British Columbia lost 250,000 salmon owing to toxic algae.

7.1 Fish and Fish Habitat VEC

p.354 - There's no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat? This should be discussed under operations and maintenance.

7.1.2.2 Presence of Farmed Salmon

p. 362 – Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, the EIS doesn't discuss how this could subsequently increase mortality on migrating wild smolts and adults.

p. 361-362 - Indirect genetic effects and ecological interactions are not adequately described nor is the potential effects of escapees on wild Atlantic salmon populations.

7.1.2.5 Maintenance of Sea Cages

p. 369 – Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies to use of monitoring on p. 370 under presence of sea cages.

7.2 Wild salmon VEC

p. 372 - There's no mention of potential escapes of farmed fish as an effect of the project on wild salmon? This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

p. 377 – Comments raised above regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7.1.1 Fish Escape – Emergency Scenario

p. 434 – It states that *'Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit'*. It would be useful for the reader if these other attributes were described. It also states that *'since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon'*. There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic salmon.

p. 435 – 2nd para, it states that *'Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon'*, however, this will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. This is an overstatement. It also references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, however, the reader has no idea whether approximately the same number of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

p. 435 – Last para, there is a reference provided whereby it states that *'even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence'*, yet escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% full-proof.

p. 435 – 3rd para, it states that *'it has been documented that farmed Atlantic salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon'*. The word *'sometimes'* should be replaced with *'commonly'*.

p. 435 – 3rd para, Keyser et al. was NOT conducted in Norway, but Atlantic Canada.

p. 436 – 1st para, there is a reference provided by Verspoor et al, which states that *'smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks'*. It is important to point out that a lot of the salmon rivers on the south coast of Newfoundland have low abundances.

p. 436 - 1st para, references missing. Conclusions based on microsatellites. Additional text needed. In fact, there are more genetic differences detected among populations in southern Newfoundland than elsewhere in the province, so the statement is incorrect.

p. 436 – 3rd para, the EIS seems to be mixing up juvenile and adult surveys, also "older individuals" is not correct. These were later stage hybrids. All individuals were young of the year. Also, update that there were no escapes captured in Fortune Bay or Bay D'Espoir in 2017 either. Interestingly enough though, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

p.440 – The statement *'...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon'* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

p.440 – It states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

7.8 Follow-Up Monitoring

p. 475 – Please clarify why the EEMP is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

7.8.2 Accidental Events

p. 476 – Again it mentions sampling would involve collecting and analyzing blood samples. Any monitoring of impacts would likely be undertaken by DFO in collaboration with Greig NL.

7.9.1.2 Wild salmon VEC

p. 478 - The EIS states that: '*Overall, planned Project activities on the WS VEC were predicted to be not significant*'.

While the proponent has outlined in detail the various mitigation measures that will be taken, many of which are to be commended, a more realistic conclusion could be the following:

Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic salmon and wild populations of Atlantic salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

p. 480 – It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it has to be low.

7.9.3 Conclusions

p. 481 – It seems unlikely the effects will be non-significant.

8.1 Summary of Mitigation Measures

Table 8.1 – Under the potential effect '*alter genetic integrity....*', it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Appears to be some inconsistencies throughout the document.

The following references should be considered for inclusion in EIS:

Dempson, J. B. et al. 2006. Stock status summary for Atlantic salmon from Newfoundland and Labrador. Canadian Science Advisory Secretariat Research Document 2006/028, 38 pp.

O'Connell, M. F. 2003. An examination of the use of angling data to estimate total returns of Atlantic salmon, *Salmo salar*, to two rivers in Newfoundland, Canada. *Fisheries Management and Ecology* 10: 201 – 208.

Pepper, V.A. et al. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. *Can. Tech. Rep. Fish. Aquat. Sci.* 2502, 53 p.

Pippy, J. 1982. Report of the working group on the interception of mainland salmon in Newfoundland. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1654.

Powell, A. et al. 2017. Use of lumpfish for sea-lice control in salmon farming: challenges and opportunities. *Reviews in Aquaculture* doi: 10.1111/raq.12194.

Robertson, M. J. et al. 2013. Population viability analysis for the South Newfoundland Atlantic salmon (*Salmo salar*) designatable unit. Canadian Science Advisory Secretariat Research Document 2013/090. 26 pp.

Stien, L. H. 2012. Skirt around a salmon sea cage to reduce infestation of sea lice resulted in low oxygen levels. *Aquacultural Engineering* 51: 21-25.

Thorstad, E. B. et al. 2008. Incidence and impacts of escaped farmed Atlantic salmon *Salmo salar* in nature. NINA Special Report 36, 110 pp.

Warren, W. G. And J. B. Dempson. 1995. Does temporal stratification improve the accuracy of mark-recapture estimates of smolt production? A case study based on the Conne River, Newfoundland. *North American Journal of Fisheries Management* 15: 126-136.

Appendix I – Stofnfiskur Certification and Verification (All-Female Triploid)

EIS cites improved triploidy induction method but data are not shown nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed, (i.e., 100% or high rates of failure). Again data is not shown.

Appendix T – Greig NL Emergency Response Plan

p. 31 - It states that '*if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented*'. I think this should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful mainly because a recapture plan wasn't in place, which resulted in delays in initiating recapture efforts.

p. 32 – 1st para, It states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state 'provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

p. 32 – 2nd para, it is recommended that an emergency licence should already be in place in the event an escape incident arises, so there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid Science to ensure any adverse effects on wild salmon are minimized.

p. 32 - 3rd para, need to specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

p. 32 – 5th para, it states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

p. 32 – 6th para, again there is reference to seeking the assistance of '*third-party providers such as local fishermen*' and engaging in recapture efforts '*as quickly as possible*'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that '*recapture nets will be checked 4 times daily while deployed*'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

p. 33 – last para, Appendix 8 appears to be missing.

Wild Atlantic Salmon Component Study

p. 1 – 2nd para, should also mention potential impacts of disease/pathogens and parasites such as sea lice.

p. 4 - 1st para, there are at least 5 non-scheduled salmon rivers missing from the EIS.

p. 4 – 2nd para, need to correct the statement that 'after hatching, Atlantic salmon spend several months to several years in their natal freshwater habitat...' as salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon which spend more than one year at sea are multi-sea-winter salmon (MSW).

p. 4 – last para, refer to comments above regarding additional information on migratory movements within Placentia Bay.

p. 5 - It states that '*Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit*'. It would be useful for the reader if these other attributes were described. It also states that '*since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon*'. There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic salmon and since they've never been used in NL before wouldn't this make the level of confidence in many of the predicted effects more uncertain?

p. 9 – 2nd para, Keyser et al. was NOT conducted in Norway, but Atlantic Canada.

p. 10 – 1st para - DFO Science has information regarding farmed salmon captured at one of our counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents. Perhaps this information should be reported in the EIS?

p. 11 – Last para, it states that '*Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon*', however, this will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. This is an overstatement. It also references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, however, the reader has no idea whether approximately the same number of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

4.4 Potential effects of Proximity of Sea Cages to Salmon Rivers

p. 15 – 2nd para, it is important to point out that the reduction in harvest limits being implemented this year in the Atlantic salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

p. 17 – Please describe methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

p. 36 - It states that '*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*' and that this could affect migration patterns if wild salmon '*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey*'. I don't recall this being mentioned in the actual EIS.

2. Maintaining Genetic Integrity and Biological Fitness of Wild salmon

p. 43 – It states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on p. 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic charr and rainbow trout are known to occur and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

4.9 Follow-up Monitoring, Planned Project Activities

p. 55 - What about validating predictions made regarding fish health, sea lice, ecological interactions, etc?

4.9.2 - Follow-up Monitoring, Accidental Events

p. 56 - Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Parrill, Erika

From: Parrill, Erika
Sent: Friday, June 22, 2018 9:09 AM
To: Ferris, Laura
Subject: RE: Last minute addition to schedule


Thank you!!

><(((o>...><(((o>...><(((o>...><(((o>...><(((o>...><(((o>

Erika Parrill
Centre for Science Advice – NL Region

From: Ferris, Laura
Sent: Thursday, June 21, 2018 6:50 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Cc: Richards, Dale E <Dale.Richards2@dfo-mpo.gc.ca>
Subject: RE: Last minute addition to schedule

Done!

June 25, 2018	Regional Science Response Process (SRP)	<u>Richards, Dale E.</u> Chair and CSA Coordinator 709-772-8892	Expected Publications: Science Response
 Review of the Environmental Impact Statement for the Placentia Bay Atlantic Salmon Aquaculture Project	NEWFOUNDLAND & LABRADOR		
St. John's, NL			

Laura Ferris

Web and Publications Administrator, Canadian Science Advisory Secretariat
Fisheries and Oceans Canada / Government of Canada
www.dfo-mpo.gc.ca/csas-sccs/ - Tel: 613-990-0293

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Government
of Canada

Gouvernement
du Canada

Canada

From: Parrill, Erika
Sent: June-21-18 12:22 PM

Johnson, Roger

From: Turner, Kelli
Sent: Friday, June 22, 2018 11:26 AM
To: Mercer, Dawn
Subject: Oceans NL Review Grieg EIS 2018.docx
Attachments: Oceans NL Review Grieg EIS 2018.docx

Hi Dawn,

Please take a look and let me know if you wish to discuss.

Thanks,
Kelli

Oceans NL Review

Grieg NL, EIS of the Placentia Bay Atlantic Salmon Aquaculture Project 2018

3.6.2.2 Study Area, pg. 130

The CSAS delineation of EBSAs will require future changes to the Placentia Bay Extension EBSA description, including its boundaries. A revised document is still in prep as of June 2018. The number of EBSAs is also expected to change with this current delineation. No changes required at this time.

4.2.6.2 Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA), pg. 195.

1st Paragraph: Previous initiatives undertaken within LOMAs will be adapted to the five priority marine bioregions: the Gulf of St. Lawrence, the Scotian Shelf, the Newfoundland-Labrador Shelves, the Western Arctic, and the Northern Shelf. It is recommended that this paragraph and references to LOMAs be removed.

2nd paragraph: See comment under 3.6.2.2 Study Area.

4.2.6.4 Other Sensitive Areas

Marine Protected Areas, pg. 202

2nd sentence: Proper terminology is 'other effective area-based conservation measures'.

Deep-sea Corals and Sponges, pg. 202

Last paragraph: Several Marine Refuges have been designated in Eastern Canada's marine waters with the conservation objective to protect cold water sponges and corals which should be added to this section. None are located within the study area. <http://www.dfo-mpo.gc.ca/oceans/oeabcm-amcepz/refuges/index-eng.html>

4.8.3 Sensitive Areas VEC, pg. 345

First paragraph: See comment under 3.6.2.2 Study Area.

7.4 Sensitive Areas VEC

Table 7.14, pg. 404: For both Fish and Fish Habitat (Table 7.1) and Birds (Table 7.7) potential interactions with lights are included, however, in Table 7.14 they are excluded. This would be inconsistent given that both fish and fish habitat and birds are principle components that were used to identify the Placentia Bay EBSA.

General Comment: Throughout Section 7.4 one of the key mitigations is avoidance of sensitive areas. This requires clarification as the EBSA as a whole has been listed as a sensitive area in this EIS. In addition, principle components which led to the EBSA's identification are also included as

sensitive areas such as important areas for ichthyoplankton while all 11 sea cage sites will overlap areas of high ichthyoplankton aggregation

7.7.3 Sensitive Areas VEC, pg. 467

Interactions between the SA VECs and fish escape scenarios are not assessed here and the rationale provided for this is that these scenarios primarily relate to effects on fish and fish habitat assessed in 7.7.1. They should be added for consistency between tables.

The following should be reviewed by DFO Science

7.4 Sensitive Areas VEC

This EIS describes sensitive habitat as important areas for ichthyoplankton while stating that all 11 sea cage sites will overlap areas of high ichthyoplankton aggregation, however, for mitigation of sea cage installation, sea cage deposition as well as other project activity effects, the key measure listed in Table 7.15 is to avoid the area.

The assessment of effects in Table 7.15, specifically the Magnitude for the aforementioned activities (0-1, negligible to minor), seems low especially given that Templeman 2007 states the EBSA's important coastal spawning and nursing areas in Placentia Bay are highly sensitive to disturbance.

7.7.3 Sensitive Areas VEC, pg. 467

The 11 sea cages overlap the sensitive area described in this EIS as being an area of high ichthyoplankton aggregation. The release of large numbers of fish in both the emergency case and worst case scenario in spring would coincide with the presence of ichthyoplankton for species such as Atlantic Cod, Capelin and American Plaice. This would be more for DFO's Science to comment on but predation by Lumpfish and Farmed Salmon introduced in these numbers could potentially affect ichthyoplankton concentrations.

Parrill, Erika

From: Parrill, Erika
Sent: Friday, June 22, 2018 1:12 PM
To: Meade, James
Subject: RE: SRP Refs
Attachments: Sources of information + ep edits.docx

Here you go! :)

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Meade, James
Sent: Friday, June 22, 2018 8:04 AM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: SRP Refs

Hi Erika,
Would you please review the references for the SRP (Attached) and complete/ format as some refs are incomplete.

Thanks and Cheers,
Jim

James D. Meade
Centre for Science Advice / Centre des avis scientifiques
Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador
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Sources of information

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**Canadian Science Advisory Secretariat
Science Response 2018/nnn**

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, NL, and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region requested that DFO Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment website at the following link:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1-Project Rationale
 - Section 2.4.3-Land-based Facility (RAS hatchery)
 - Section 2.4.4-Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2-Physical Environment
 - Section 4.2.3-Fish and Fish Habitat
 - Section 4.2.4-Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 - Effects of the Environment on the Project**
- **Section 7.0 - Effects of the Project on the Environment**
- **Section 7.1 - Fish and Fish Habitat VEC**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2-Wild Salmon VEC
 - Section 7.9.2-Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret, likely due to the experience of the proponent with this type of project. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation.

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/ disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics/ routes. This seems contrary to the purpose of creating BMAs.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by an ROV and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. What frequency will the ROV monitor the cages? Daily?

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension EBSA and that this is considered the 'maximum extent' wherein potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away.

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1992). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information/ estimate.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Please confirm/ clarify.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 11. The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay. Although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US market, notwithstanding the potential impacts it could have on local fisheries resources, particularly Atlantic Salmon.

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Status of wild Atlantic salmon in Norway 2017. Eva Thorstad and Torbjorn Forseth). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page. 14. *“Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic salmon, recent research and industry results show that triploid Atlantic salmon perform equal or better than diploid salmon.”* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *“In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay”* is premature. Also, while the study is now somewhat dated, triploid rainbow trout were not found to perform better than diploids at Bay d’Espoir (Pepper et al. 2003).

Page 16. *“Hansen et al. (2015) also compared performance of diploid and triploid Atlantic salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia).”* The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reconsidered.

Page 16. *“Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern.”* As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that *“triploid female salmon do not enter freshwater”*, however, it states here that *“the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes.”* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not commonly used, yet.

Page 45. It states that Greig NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012).

Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..."* This would imply that all nets are replaced approximately every year. Please revisit and confirm.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/ corrective action will be developed as per the established SOP. This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/ commitment to use well boats for this purpose, as Greig NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? There should also be some discussion regarding the transfer of pathogens/disease from lumpfish to salmon.

The stock origin of the lumpfish (cleaner fish) is not clear. Also, the density of lumpfish (i.e., 16,000 per cage) appears very high. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. While it is assumed that Grieg staff are experienced in this process, examples of past successful transfers and rates of accident/losses would also be useful in this context.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/ disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. The proposed logistics seem contrary to the purpose of creating BMAs. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination."* However, they will use the routes crossing BMAs, as shown in Figure 2.53, thereby not really mitigating risk of cross-contamination.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *'typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...'* Please revisit and clarify for consistency.

Page.92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites"*, exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: *"In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality"* is misleading as only one intense winter could be problematic. A recent example is winter 2014 which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland shelf) region?

Page 100. *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage."*

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated.” These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The CFIA website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 – 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment is lacking in detail and seems overly optimistic that there would be little to no problems. The “assessment” is thin.

Section 3.0 – Effects Assessment Methodology

Page 128. Economy: Training, Employment and Business is not a “VEC” in the conventional context of an EIS. This information is acceptable from an economics context, but it does not belong in the ecological portions of the report. This pattern is repeated at several points in the document in Sections 3, 4, & 7.

Page 130. Project Area. The Marine Industrial Park may have runoff from the facilities located there under some scenarios, with a potential for runoff into the marine environment. However, there is no mention or evaluation of the potential for this outcome. It is difficult to believe the probability of this scenario is zero, as the wording in the text implies.

Page 130. Study Area. It states that “*The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA*” and that “*This is considered the maximum extent wherein there is potential for effects of the Project to occur...*” Although the EA Committee felt it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Location of Rivers. The document states that *"...the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site"*, whereas earlier in the EIS (p. 96) it states that *"the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* Please revisit and clarify for consistency.

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled over the years, and which is considered to be the most important issue. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not even referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. Using tides only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle) but a longer time-series is necessary to be representative. Wind forcing and the Labrador Current are variable on a timescale of days to seasons; again implying the need for long time-series. Consequently, the data collected for this study and presented in Table 4.5 are not

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e.: not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/ or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

Page 145. Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long term data available from other sources. For example: <http://navigator.oceansdata.ca/public/>

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability would be helpful and should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important/ (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1) Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;

2) Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where this data is or if it was collected, but it was not discussed in the report.

3) Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this is already known from studies performed in Placentia Bay (see Matheson et al. 2016). The evidence for this is rather conclusive and well documented, and the supporting paper has been published for two years. The proponent should not cite "pers. comm." sources when published accounts from the area are readily available.

Additionally, why present information about eelgrass restoration only? Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014).

Page 166. There is no mention of the threatened designation for lumpfish from COSEWIC in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is considered as a concern or not.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. Habitat should be discussed at a larger spatial scale.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also clearly indicated that with respect to South Newfoundland, had the analysis extended back just one (1) single year (i.e.: over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador. A retrospective analysis of salmon returns to Conne River for the years 1976 – 1985 (10 year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 years of the fish counting fence operation (1986 – 1989) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided here.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least one year or more.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al., 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion is weak and missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by ICES, "is potentially quite risky."

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps regarding cumulative effects are also significant. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environment knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged and addressed. Water structure seasonality (i.e.: temperature and salinity) are also data gaps that still need to be addressed, particularly salinity.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. *"Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)."* The correlation could not be found in the document cited.

Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. *"Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-*

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

up or nutrification." The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; how is the term "adequate" defined in this context?

Page 352. Algal Blooms. This section of document cites DFO 2010c many times (almost the only reference and the source of the Harmful Algal Bloom (HAB) map). This is not included in the references and the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. The information appears to be correct although likely a little underestimated, as the finfish aquaculture industry on the south coast considers HABs a concern, and it is certainly a major issue in BC with increasing concern in the NL Region.

The document refers to the potential for toxic algal blooms but states that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, Greig salmon farms in British Columbia recently lost 250,000 salmon owing to toxic algae.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, simply lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant (NS), yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "NS".

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. entirely too short) the estimated benthic loading of carbon provided in this section cannot really be trusted (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and OPC may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 364. *“Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles.”* As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO AAR (Aquaculture Activities Regulations) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of ‘acceptable’ organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *“Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit.”* It would be useful for the reader if these other attributes were described. It also states that *“since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon.”* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *“Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.”* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc... The document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 435. In the statement *"it has been documented that farmed Atlantic salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be replaced with 'commonly'.

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, yet escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that a lot of the salmon rivers on the south coast of Newfoundland have low abundances.

Page 436. The authors seem to be mixing up juvenile and adult surveys. Also "older individuals" is not correct; these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in 2017 either. Interestingly, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: *"...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon"* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

Page 476. Accidental Events. Again, sampling would involve collecting and analyzing blood samples. Any monitoring of impacts would likely be undertaken by DFO in collaboration with Greig NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: *"Overall, planned Project activities on the WS VEC were predicted to be **not significant**"*. While the proponent has outlined in detail the various mitigation measures that will be implemented, many of which are to be commended, a more realistic conclusion could be: Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

Page 480. It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it would be low.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect '*alter genetic integrity...*' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are multi-sea-winter salmon (MSW).

Page 5. It states that "*Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit.*" It would be useful if these other attributes were described. It also states that "*since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon.*" There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of our counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents and this information should be reported and discussed in the EIS.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey"*. This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc...

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data is not provided.

Appendix T – Wild Atlantic Salmon Component Study: Greig NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful mainly because a recapture plan wasn't in place, which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."*

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste"*, which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Greig NL Benthic Depositional Modelling Report

The ocean current timeseries used for this study are too short to give statistically robust estimates of dispersion. Looping a few days timeseries on itself to make it a month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Page 8. The basis for using 1,124 kg/cage/day feed input is not clear. Is it the maximum load (worst case scenario as requested by AAR) or something-else?

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e.: prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. *"The positive phase of the NAO index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here and where other such statements are made. For example the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (pg. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 36. Please provide references for the datasets that have already been documented (e.g. MUN data are as data reports: Hart et al 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. "At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m." It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long term (vector-averaged) mean might be. The source of this information is unclear (reference? Mooring name?). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Conclusions

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion.
- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate and misleading statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. This is unlikely.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each BMA) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the proponent;

- As the Environmental Effects Monitoring and Follow-up Program (EEMP) has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Greig NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

Contributors

Name	Affiliation
Ian Bradbury	DFO Science
Kate Dalley	DFO Science
Brian Dempson	DFO Science
Sebastien Donnet	DFO Science
Carole Grant	DFO Science
Bob Gregory	DFO Science
Roger Johnson	DFO Ecosystems Management
Dounia Hamoutene	DFO Science
Cynthia McKenzie	DFO Science
James Meade	DFO Science
Andry Ratsimandresy	DFO Science
Dale Richards	DFO Science (Chair)
???	DFO Ecosystems Management

Approved by

B. R. McCallum
Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Sources of information

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This Report is Available from the

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Fisheries and Oceans Canada
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Internet address: www.dfo-mpo.gc.ca/csas-sccs/

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Aussi disponible en français :

MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page
couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.

Meade, James

From: Meade, James
Sent: June-22-18 1:44 PM
To: Clarke, Keith
Subject: RE: as requested

Excellent!
Thanks Keith.

From: Clarke, Keith
Sent: June-22-18 1:20 PM
To: Meade, James
Subject: as requested

Keith D. Clarke
Section Head, Ecological Sciences Section
Science Branch | Section des sciences
Fisheries and Oceans Canada | Pêches et Océans Canada
PO Box / CP 5667
St. John's, Newfoundland and Labrador | Terre-Neuve et Labrador
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Parrill, Erika

From: Parrill, Erika
Sent: Friday, June 22, 2018 2:46 PM
To: Richards, Dale E; Hamoutene, Dounia; Ratsimandresy, Andry; Donnet, Sebastien G;
Grant, Carole; Bradbury, Ian R; Gregory, Robert; Dalley, Kate L; McKenzie, Cynthia;
Johnson, Roger
Cc: Korchoski, Connie; Meade, James; Kelly, Jason; Dempson, Brian
Subject: For your review - Draft Science Response - Grieg PB Aquaculture EIS
Attachments: DRAFT Grieg PB Aquaculture EIS SRR.docx

Hello,

Please see attached for the Draft Science Response which we will review at Monday's meeting.

-Erika

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Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309

**Pages 357 to / à 380
are duplicates of
sont des duplicatas des
pages 331 to / à 354**

Richards, Dale E

De: Grant, Carole
Envoyé: June-22-18 3:26 PM
À: Davis, Ben; McCallum, Barry
Cc: Meade, James; Richards, Dale E
Objet: Fw: Asf review

FYI in case you haven't seen already.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Ian Bradbury <[REDACTED]>
Sent: Friday, June 22, 2018 1:59 PM
To: Grant, Carole
Cc: Dempson, Brian
Subject: Asf review

<http://asf.ca/grieg-nl-placentia-bay-study-fails-to-meet-review-guideline.html>

Dr. Ian Bradbury
Research Scientist , Salmonids Section
Science Branch, Fisheries and Oceans Canada
80 East White Hills Road, P. O. Box 5667
St. John's, NL , Canada, A1C 5X1
Website: Bradburygeneticslab.com
Ph: [\(709\) 772-3869](tel:7097723869)
Email: ian.bradbury@dfo-mpo.gc.ca

s.19(1)

Richards, Dale E

De: Parrill, Erika
Envoyé: June-22-18 7:33 PM
À: Richards, Dale E
Objet: Fw: For your review - Draft Science Response - Grieg PB Aquaculture EIS

FYI

Sent from my BlackBerry 10 smartphone on the Bell network.

Original Message

From: Hamoutene, Dounia <Dounia.Hamoutene@dfo-mpo.gc.ca>

Sent: Friday, June 22, 2018 7:07 PM

To: Parrill, Erika

Subject: RE: For your review - Draft Science Response - Grieg PB Aquaculture EIS

Hi Erika

Just realised that I had a conf call at 1.30 (sorry about that). I will be there for 30 min then if conf call does not last i will
rejoin Apologies Thanks _____

From: Parrill, Erika

Sent: June 22, 2018 2:15 PM

To: Richards, Dale E; Hamoutene, Dounia; Ratsimandresy, Andry; Donnet, Sebastien G; Grant, Carole; Bradbury, Ian R;
Gregory, Robert; Dalley, Kate L; McKenzie, Cynthia; Johnson, Roger

Cc: Korchoski, Connie; Meade, James; Kelly, Jason; Dempson, Brian

Subject: For your review - Draft Science Response - Grieg PB Aquaculture EIS

Hello,

Please see attached for the Draft Science Response which we will review at Monday's meeting.

-Erika

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> ,.'-'`.,><(((e>

Erika Parrill, M.A., B.A., B. Comm.

Science Advice Liaison

Centre for Science Advice – NL Region

709-727-6309

Parrill, Erika

From: Parrill, Erika
Sent: Sunday, June 24, 2018 8:07 PM
To: 'Brian Dempson'
Cc: Richards, Dale E; Grant, Carole
Subject: RE: Draft Science Response - Greig EIS

Thank you Brian for reviewing the Science Response. I will update the latest draft with your edits. Your help is very much appreciated.

-Erika ☺

><(((°> ,><(((°> ,><(((°> ,><(((°> ,><(((°> ,><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Brian Dempson [REDACTED]
Sent: Saturday, June 23, 2018 8:08 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>
Subject: Draft Science Response - Greig EIS

Erika
Carole

Made a few edits to the draft Science response but expect there will be changes following the discussion next week. Document needs to be checked for references cited.

Brian

s.19(1)

Johnson, Roger

From: Hendry, Christopher
Sent: Monday, June 25, 2018 9:26 AM
To: Johnson, Roger
Subject: FW: Preparation for Grieg EIS review
Attachments: EIS Review.docx; RE: Preparation for Grieg EIS review

From: Hendry, Christopher
Sent: June-01-18 10:16 AM
To: Johnson, Roger
Subject: FW: Preparation for Grieg EIS review

See below. As per the attached message, the new date for DFO response to the Province is July 13, 2018.

Chris

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: May-16-18 1:07 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Sweeney, Joanne
Cc: Squires, Susan
Subject: Preparation for Grieg EIS review

Hi All,

I'm anticipating the submission of the Grieg EIS later today or tomorrow. Once submitted, the role of the EAC is as follows:

1. to provide scientific, technical, and professional advice to the Minister of Municipal Affairs and Environment regarding the adequacy of documents (Component Studies and the EIS); and
2. to recommend to the Minister whether the proposed project should proceed based on its environmental acceptability.

I've attached an EIS review sheet for you to record whether sections of the EIS meet the information requirements of the EIS Guidelines (acceptable), whether the information provided contravenes the Environmental Protection Act, or another Act of the province or of Canada (unacceptable), or whether the information is deficient. Please provide rationale for your determination (on an additional page(s)), where appropriate.

In acknowledgement of the unique mandate of each EAC member, I've included in the review sheet the initials of committee members whose mandates best match the information required by each section of the guidelines. I encourage you to review and comment on all sections of the documents, but to focus on the sections that are applicable to your mandate. There may be sections where you feel it's beyond your mandate to provide comment, in which case you may indicate N/A in the appropriate column.

In accordance with the Guidelines for Environmental Assessment Committees, within 45 days of receiving the EIS and Component Studies, please provide me with your completed review form including a written opinion as to whether the EIS is satisfactory, or unsatisfactory. You may include your opinion at the end of the review sheet in the space provided, or attach an additional page(s) if needed. If you find the EIS unsatisfactory, please provide written recommendations

concerning the measures which must be taken by the proponent to render it satisfactory. If you receive the EIS tomorrow, which is a possibility, 45 days later will be July 1, 2018 (Sunday and a holiday, so we'll go with July 2, 2018).

Public comments on the EIS will be due by July 6, 2018, should the document be posted on the Gov NL web site tomorrow. The EAC will provide a written EIS recommendation to the Minister asap after the public comments have been considered (which I'll be doing throughout the review period), and the minister's decision as to the acceptability of the EIS will be given to the proponent by July 26, 2018.

As always, if you have any questions or concerns give me a call or send me an email.

Regards,

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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EIS REVIEW

Placentia Bay Atlantic Salmon Aquaculture Project (1834)

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
2.1 Study Areas		
a.	JA,BA, CG	
b.	JA, JP, MG	
c.	CH, CG, BA, JK, MG, JP	
d.	JA,DH, VF, JK	
e.	CH, CG, JK, BA	
f.	JA, JK, BA, CH, CG	
g.	DW, JK, CH, CG	
2.2 Rationale for the Undertaking		
1 st bullet	All	
2 nd bullet	All	
3 rd bullet	All	
4 th bullet	All	
5 th bullet	All	
2.3.1 General Layout		
a.	All	
b.	DH, VF, JP	
c.	JP, AD, VF, MG	
d.	JP,JS	
e.	CH, CG, JK, BA, JP	
f.	JA, CH, CG, JK, BA, JP, MG	
g.	CH, CG, JK, BA, JP, MG	
2.3.2 Construction		
a.	DW, JK	
b.	JP, DH	
c.	JP, JS	
d.	JP, DH	
e.	JP, CH, JK, DW	
f.	JP, DH, MG	
g.	JP, AD, MG	
h.	JP, VF, JS, AD	
i.	JS	
j.	AD, VF, MG, JP	
k.	VF, JP, JK, AD	
l.	JP, VF, BA, CG	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A *
2.3.3 Operation and Maintenance		
a.	DW,JK,CH, DH,VF	
b.	DW, JK, CH, BA, CG	
c.	DW, JK, CH	
d.	DW, JK, CH, BA, CG	
e.	DW, JK, CH, BA, CG	
f.	DW, JK, CH, BA, CG, JP	
g.	DW, JK, CH, BA, CG, MG	
h.	DH	
i.	DH	
j.	DW, JK, CH	
k.	DW, JK, CH, VF, JP	
l.	DW, JK, CH, BA, CG, MG, VF, JP	
m.	DW, JK, CH, BA, CG, MG, JA, JP	
n.	DW, JK, CH, BA, CG, MG, AD, JP	
o.	DW, JK, CH, BA, CG, MG, AD, JP	
p.	DW, JK, CH, BA, CG, MG, VF, JP	
q.	JK, CH, BA, CG, MG, VF, JP, AD, JA	
r.	VF, AD, JP,JK, CH, DW	
s.	DW, AD, JP	
t.	AD, DW, CH, JK, JP	
u.	AD,DW, CH, JK, VF, JP	
v.	VF, JP, AD	
w.	VF, JP, AD, CH, JK,BA, CG	
x.	JP, VF, MG	
y.	JK, CH, MG, VF, JP, BA, CG, DH	
z.	AD, JK, CH, BA, CG, JP	
aa.	JS	
2.3.4 Decommissioning and Rehabilitation		
a.	JK, JS	
b.	JS	
c.	JK, CH, CG, BA, MG, JP	
d.	CH, CG, BA, MG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
2.3.5 Regulatory Frame work		
a.	All	
b.	All	
c.	All	
3.1 Alternatives to the Undertaking		
a.	JK, BA, CH, CG, JS, AD, MG	
b.	JK, BA, CH, CG, JS, AD, MG	
3.2 Alternative Methods of Carrying Out the Undertaking		
a.	JK, BA, CH, CG, JA, MG	
b.	JK, BA, CH, CG, JA	
c.	JK, BA, CH, CG, VF	
d.	JK, BA, CH, CG, TC, EC	
4.1 Key Issues		
1 st bullet	All	
2 nd bullet	All	
3 rd bullet	All	
4 th bullet	All	
4.2.1 Atmospheric Environment		
a.	CH, CG, JK. BA, JP	
b.	CH, CG, JK. BA, JP	
c.	JP, AD, VF, JS	
d.	JP, AD, VF	
4.2.2 Aquatic Environment		
a.	JK, BA, CH, CG	
b.	JK, BA, CH, CG, JP, MG	
c.	JK, BA, CH, CG, JP	
d.	BA, CG, JP	
e.	JK, BA, CH, CG, JP	
f.	JK, BA, CH, CG, JP, MG	
g.	JK, BA, CH, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.2.3 Terrestrial Environment		
a.	JP, BA	
b.	DH	
c.	DH	
d.	DH	
e.	JP, BA	
f.	JP, BA	
g.	JP, BA	
h.	DW, BA, JK	
4.2.4 Land and Resource Use		
a.	CH, CG, JK, BA, JA	
b.	JA, CH, JK	
c.	JA, MG, JK, CH	
d.	BA, CG, JA	
e.	JA	
4.2.5 Heritage Resources		
a.	JA, JS	
b.	JA, JS	
c.	JA, JS	
d.	JA, JS	
4.2.6 Communities		
a.	JA, AD	
b.	JA, AD	
c.	JA	
d.	JA, JS	
e.	JA	
4.2.7 Economy, Employment, and Business		
a.	JA	
b.	JA	
c.	JS	
d.	JA	
e.	JA, JS	
f.	JA	

*Please provide rationale on an additional page, where applicable.

COMPONENT STUDIES

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.1 Component Study – Wild Atlantic Salmon		
a.	CG, BA, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, BA, CG, JK, CH	
d.	CG, BA, CH, JK	
e.	CH, CG, JK, BA, JP, MG	
f.	CH, CG, JK, BA, JP, MG	
g.	CH, CG, JK, BA, JP, MG	
h.	DW, JK, BA, CH, CG, JP, AD, MG, VF	
i.	DW, VF, AD, TC, JP	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.2 Component Study – Fish and Fish Habitat		
a.	CG, BA, JP, CH, JK	
b.	CG, BA, JP, MG, JK, CH	
c.	CG, BA, JP, MG, CH, JK	
d.	CH, JK, DW, JP	
e.	CH, CG, JK, BA, JP, MG	
f.	CH, CG, JK, BA, JP, MG	
g.	DW, VF, AD, JK, CH, TC, JP, BA, CG	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.3 Component Study – The Cultural, Recreational, and Commercial Importance of the Waters of Placentia Bay		
a.	CH, CG, JA, MG	
b.	JA	
c.	MG, JA, CH, CG, BA, JP	
d.	CG, BA, JP, JA, CH, JK	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.4 Component Study – Aqualine Midgard Sea-Cage Study		
a.	CH, JK, CG, BA	
b.	CH, JK, CG, BA	
c.	CH, JK, CG, BA, JP, MG	
d.	CH, JK, CG, BA, JP	
e.	CH, JK, CG, BA, JP	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
5.0 Data Gaps	All	
6.1 Predicted Future Condition of the Environment if the Undertaking Does Not Proceed	All	
6.2 Predicted Environmental Effects of the Undertaking		
a.	CG, BA, CH, JK, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, CG, BA, CH, JK	
d.	CG, BA, CH, JK, DW	
e.	JP, CG, BA	
f.	CG, BA, CH, JK, DW, AD, VF	
g.	CG, BA, CH, JK, JP, DW	
h.	CH, CG, MG, JA, JP	
i.	JA	
j.	BA, CG, CH, JK, MG, JP	
k.	JP, BA	
l.	CH, JK, JA	
m.	VF, JP	
n.	VF, JS, JP, AD	
6.3 Accidents and Malfunctions		
a.	BA, CG, CH, JK	
b.	VF, JK, DW, CH, JP, AD	
c.	CH, JK, DW, BA, CG, AD, VF, JP	
d.	JK, DW, DH	
e.	CH, JA, MG, JK, JP	
f.	All	
6.4 Cumulative Environmental Effects		
a.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
b.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
c.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
d.	JS, AD, MG, JK, CH, JA, BA, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A *
6.5 Effects of the Environment on the Project	All	
7.1 Mitigation		
a.	CH, CG, JK, BA, MG	
b.	CH, CG, JK, BA	
c.	CH, CG, JK, BA	
d.	CH, CG, JK, BA	
e.	CH, CG, JK, BA	
f.	CH, CG, JK, BA, JP	
g.	CH, CG, JK, BA, JP, DW	
h.	CH, CG, JK, BA, DW	
i.	CH, CG, JK, BA, DW	
j.	CH, CG, JK, BA, DW	
k.	CH, CG, JK, BA, DW	
l.	DW, AD, VF, JP, CH, JK, CG, BA	
m.	DW, CG, BA, CH, JK, JP	
n.	CH, JK, DW, BA, CG, JP, AD, VF	
o.	JK, DW, CH, AD, VF, JP	
p.	BA, CG, CH, JK, MG, JP	
q.	CG, BA, JK, CH, JP, JA	
r.	JK, DW, CH, AD, JP	
s.	JS, JP, VF, AD	
t.	JP, BA	
7.2 Emergency Response/Contingency Plans		
a.	VF, JP, MG, DH	
b.	All	
c.	VF, AD, JP, JK, CH, DW	
d.	JK, CH, CG, BA, JP	
e.	DW, JK, CH, AD, VF, JP	
7.3 Waste Management Plan		
a.	VF, JP, AD	
b.	VF, DW, JP, AD, JK, CH, DH	
c.	VF, JP, AD, DH, MG	
d.	CH, JK, JP, MG, JA	
e.	JK, CH, JP, CG, BA, JP, DW	
f.	JK, CH, CG, BA, JP	
g.	VF, DH, JP, CG, BA	
h.	VF, JP, JK, AD, JS	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
7.4 Environmental Effects Monitoring and Follow-up Program (EEMP)		
a.	CG, BA, JK, CH, DW, JP	
b.	CG, BA, JK, CH, DW, JP	
c.	BA, JK, CH, DW, JP	
d.	CG, BA, JK, CH, DW, JP	
e.	CG, BA, JP	
f.	CH, JK, CG, BA, JP	
g.	DH	
h.	CH, CG, JK, BA, JP	
8.0 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE	All	
9.0 ASSESSMENT SUMMARY AND CONCLUSIONS	All	
10.0 PUBLIC PARTICIPATION	JS	
11.0 ENVIRONMENTAL PROTECTION PLAN (EPP)	All	
13.0 PERSONNEL	All	
14.0 COMMITMENTS MADE IN THE EIS	All	
15.0 COPIES OF REPORTS	JS	

*Please provide rationale on an additional page, where applicable.

EIS OPINION:

Name: _____

Date: _____

Grant, Carole

From: Grant, Carole
Sent: Monday, June 25, 2018 10:01 AM
To: Bradbury, Ian R
Subject: FW: Draft Science Response - Greig EIS
Attachments: DRAFT Grieg PB Aquaculture EIS SRR - BD.docx

From: Brian Dempson [REDACTED]
Sent: June-23-18 8:08 PM
To: Parrill, Erika; Grant, Carole
Subject: Draft Science Response - Greig EIS

Erika
Carole

Made a few edits to the draft Science response but expect there will be changes following the discussion next week. Document needs to be checked for references cited.

Brian

s.19(1)



Fisheries and Oceans
Canada

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Ecosystems and
Oceans Science

Sciences des écosystèmes
et des océans

Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, NL, and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region requested that DFO Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

June 2018

Canada

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment website at the following link:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1-Project Rationale
 - Section 2.4.3-Land-based Facility (RAS hatchery)
 - Section 2.4.4-Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2-Physical Environment
 - Section 4.2.3-Fish and Fish Habitat
 - Section 4.2.4-Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 - Effects of the Environment on the Project**
- **Section 7.0 - Effects of the Project on the Environment**
- **Section 7.1 - Fish and Fish Habitat VEC**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2-Wild Salmon VEC
 - Section 7.9.2-Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret, likely due to the experience of the proponent with this type of project. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties, associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation.

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics/ routes. This seems contrary to the purpose of creating BMAs.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by an ROV and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. What frequency will the ROV monitor the cages? Daily?

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension EBSA and that this is considered the 'maximum extent' wherein potential effects could occur. Although the EA Committee felt it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1992). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Newfoundland and Labrador Region

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information/ estimate.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Please confirm/ clarify.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 11. The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay. Although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US market, notwithstanding the potential impacts it could have on local fisheries resources, particularly Atlantic Salmon.

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Status of wild Atlantic salmon in Norway 2017. Eva Thorstad and Torbjorn Forseth, ~~In view of Norwegian Scientific Advisory Committee for Atlantic Salmon. 2017). Status of wild Atlantic Salmon in Norway 2017). In view of~~ this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to

Newfoundland and Labrador Region

evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Page 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic salmon, recent research and industry results show that triploid Atlantic salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid rainbow trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)."* The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reconsidered.

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern."* As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater"*, however, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still

thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not commonly used, yet.

Page 45. It states that Greig NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012).

Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..."* This would imply that all nets are replaced approximately every year. Please revisit and confirm.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established SOP. This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Greig NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? There should also be some discussion regarding the transfer of pathogens/disease from lumpfish to salmon.

The stock origin of the lumpfish (cleaner fish) is not clear. Also, the density of lumpfish (i.e., 16,000 per cage) appears very high. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. While it is assumed that Grieg staff are experienced in this process, examples of past successful transfers and rates of accident/losses would also be useful in this context.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/ disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. The proposed logistics seem contrary to the purpose of creating BMAs. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use*

the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." However, they will use the routes crossing BMAs, as shown in Figure 2.53, thereby not really mitigating risk of cross-contamination.

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that 'typically once a year, Greig NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...' Please revisit and clarify for consistency.

Page.92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites", exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: "In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality" is misleading as only one intense winter could be problematic. A recent example is the winterchill event in 2014 which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected?

Newfoundland and Labrador Region

What are the current expectations with respect to climate change for the (Newfoundland shelf) region?

Page 100. "A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The CFIA website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment is lacking in detail and seems overly optimistic that there would be little to no problems. The "assessment" is thin.

Section 3.0 – Effects Assessment Methodology

Page 128. Economy: Training, Employment and Business is not a "VEC" in the conventional context of an EIS. This information is acceptable from an economics context, but it does not belong in the ecological portions of the report. This pattern is repeated at several points in the document in Sections 3, 4, & 7.

Page 130. Project Area. The Marine Industrial Park may have runoff from the facilities located there under some scenarios, with a potential for runoff into the marine environment. However, there is no mention or evaluation of the potential for this outcome. It is difficult to believe the probability of this scenario is zero, as the wording in the text implies.

Page 130. Study Area. It states that "The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA" and that "This is considered the maximum extent wherein there is potential for effects of the Project to occur..." Although the EA Committee felt it was

reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species.

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Location of Rivers. The document states that *"...the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site"*, whereas earlier in the EIS (p. 96) it states that *"the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* Please revisit and clarify for consistency.

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled over the years, and which is considered to be the most important issue. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not even referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. Using tides only,

Newfoundland and Labrador Region

one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle) but a longer time-series is necessary to be representative. Wind forcing and the Labrador Current are variable on a timescale of days to seasons; again implying the need for long time-series. Consequently, the data collected for this study and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e.: not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/ or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

Page 145. Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long term data available from other sources. For example: <http://navigator.oceansdata.ca/public/>

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability would be helpful and should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important/ (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

- 1) Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;

- 2) Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites

Newfoundland and Labrador Region

for AIS biofouling. It is not known where this data is or if it was collected, but it was not discussed in the report.

3) Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this is already known from studies performed in Placentia Bay (see Matheson et al. 2016). The evidence for this is rather conclusive and well documented, and the supporting paper has been published for two years. The proponent should not cite "pers. comm." sources when published accounts from the area are readily available.

Additionally, why present information about eelgrass restoration only? Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014).

Page 166. There is no mention of the threatened designation for lumpfish from COSEWIC in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is considered as a concern or not.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. Habitat should be discussed at a larger spatial scale.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also clearly indicated that with respect to South Newfoundland, had the analysis extended back just one (1) single year (i.e.: over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador. A retrospective analysis of salmon returns to Conne River for the years 1976 – 1985 (10 year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 years of the fish counting fence operation (1986 – 1989) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided here.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least ~~one~~ two or more ~~years in Newfoundland systems.~~ or more.

Page 175. The document states "Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies

Newfoundland and Labrador Region

clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al., 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion is weak and missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by ICES, "is potentially quite risky."

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps regarding cumulative effects are also significant. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environment knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged and addressed. Water structure seasonality (i.e.: temperature and salinity) are also data gaps that still need to be addressed, particularly salinity.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.

Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events,

Newfoundland and Labrador Region

the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. *"Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or eutrophication."* The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; how is the term "adequate" defined in this context?

Page 352. Algal Blooms. This section of document cites DFO 2010c many times (almost the only reference and the source of the Harmful Algal Bloom (HAB) map). This is not included in the references and the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. The information appears to be correct, although likely a little underestimated, as the finfish aquaculture industry on the south coast considers HABs a concern, and it is certainly a major issue in BC with increasing concern in the NL Region.

The document refers to the potential for toxic algal blooms but states that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, Greig salmon farms in British Columbia recently lost 250,000 salmon owing to toxic algae.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, simply lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant (NS), yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "NS".

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. entirely too short) the estimated benthic loading of carbon provided in this section

Newfoundland and Labrador Region

cannot really be trusted (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and OPC may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO AAR (Aquaculture Activities Regulations) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc... The document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether

Newfoundland and Labrador Region

approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be replaced with 'commonly'.

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, yet escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that a lot many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The authors seem to be mixing up juvenile and adult surveys. Also "older individuals" is not correct; these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys either. Interestingly, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: *"...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon"* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

Page 476. Accidental Events. Again, sampling would involve collecting and analyzing blood samples. Any monitoring of impacts would likely be undertaken by DFO in collaboration with Greig NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: “Overall, planned Project activities on the WS VEC were predicted to be **not significant**”. While the proponent has outlined in detail the various mitigation measures that will be implemented, many of which are to be commended, a more realistic conclusion could be: Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d’Espoir and Fortune Bay are doing poorly by comparison with historic information.

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

Page 480. It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it would be low.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect ‘alter genetic integrity....’ it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that ‘after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...’ as Atlantic salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are multi-sea-winter salmon (MSW).

Page 5. It states that “Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit.” It would be useful if these other attributes were described. It also states that “since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon.” There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance,

resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of our counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents and this information should be reported and discussed in the EIS.

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey"*. This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc...

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data is not provided.

Appendix T – Wild Atlantic Salmon Component Study: Greig NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely

Newfoundland and Labrador Region

difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful mainly because a recapture plan wasn't in place, which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."*

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste"*, which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

**Appendix A - Fish and Fish Habitat Component Study: Greig NL Benthic
Depositional Modelling Report**

The ocean current timeseries used for this study are too short to give statistically robust estimates of dispersion. Looping a few days timeseries on itself to make it a month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Page 8. The basis for using 1,124 kg/cage/day feed input is not clear. Is it the maximum load (worst case scenario as requested by AAR) or something-else?

**Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for
the Placentia Bay Aquaculture Sites**

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e.: prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. *"The positive phase of the NAO index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here and where other such statements are made. For example the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see

Newfoundland and Labrador Region

Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (pg. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. MUN data are as data reports: Hart et al 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long term (vector-averaged) mean might be. The source of this information is unclear (reference? Mooring name?). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Conclusions

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion.
- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate and misleading statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. This is unlikely.

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each BMA) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the proponent;

- As the Environmental Effects Monitoring and Follow-up Program (EEMP) has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Greig NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

Contributors

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Approved by

B. R. McCallum
Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

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Salmon Aquaculture Project.

Newfoundland and Labrador Region

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MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci. 2018/nnn.

Glavine, Paul

From: Glavine, Paul
Sent: June-25-18 10:27 AM
To: Johnson, Roger
Cc: Pilgrim, Bret; Janes, Gillian; Corbett, Frank
Subject: Grieg Aquaculture EIS

Hi Roger:

As requested, we have reviewed Section 4.4 (Land and Resource Use) of the EIS of the Placentia Bay Atlantic Salmon Aquaculture Project. The analysis in this section is based on commercial fishing data from various sources including DFO (Atlantic-wide and NL) and the NAFO Statlant21A dataset (international data), which we cannot evaluate in this regional office. However, based on the DFO information, which includes fish landings and landed value data, the report appears to provide a reasonable description of commercial fishing activity in the area.

Paul

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Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that ~~DFO~~ Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment website at the following link:

<http://www.mae.gov.nl.ca/env-assessment/projects/Y2016/1834/index.html>

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1.- Project Rationale
 - Section 2.4.3.- Land-based Facility (RAS hatchery)
 - Section 2.4.4.- Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2.- Physical Environment
 - Section 4.2.3.- Fish and Fish Habitat
 - Section 4.2.4.- Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat Value Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2.- Wild Salmon VEC
 - Section 7.9.2.- Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret, likely due to the experience of the proponent with this type of project. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties, associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation.

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics/routes. Additional information is required on mitigation measures for biosecurity risks and invasive species. This seems contrary to the purpose of creating BMAs.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by an remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. What frequency will the ROV monitor the cages (e.g., monthly monitoring, ROV to be shared between BMAs)? Daily?

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee felt it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 19892). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information/-estimate.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Please confirm/-clarify.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 11. The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay. Although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US market, notwithstanding the potential impacts it could have on local fisheries resources, particularly Atlantic Salmon.

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased

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Introgression is #1 threat in Norway

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

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Page 14. "Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon." This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: "In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay" is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Commented [PE3]: Not in reference list

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Tlusty. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

Commented [PE4]: Not in reference list

Page 16. "Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)." The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reconsidered.

Commented [PE5]: Concern because of baseline data and should be reviewed during NL site licensing process

Page 16. "Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern." As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that "triploid female salmon do not enter freshwater", however, it states here that "the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes." Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 - Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used, ~~yet~~.

Page 45. It states that Greig-Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts wouldn't be recommended in areas of hypoxia due to

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Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. "Typically once a year, Greig-Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..." This would imply that all nets are replaced approximately every year. Please revisit and confirm and explain why once a year.

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Page 64. "If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats." Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? There should also be some discussion regarding the transfer of pathogens/disease from lumpfish to salmon.

The stock origin of the lumpfish (cleaner fish) is not clear. ~~Also, the density of lumpfish (i.e., 46,000 per cage) appears very high.~~ This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. "Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated." These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. While it is assumed that Grieg staff are experienced in this process, ~~examples of past successful transfers and rates of accident/losses would also be useful in this context.~~

Commented [PE6]: Comparison with SOPs

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Page 76. "The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination." It is unclear how this will be achieved as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

as pathogens could be present in a given BMA and then transmitted to another BMA. The proposed logistics seem contrary to the purpose of creating BMAs. Relatedly, on page 98: "Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." However, they will use the routes crossing BMAs, as shown in Figure 2.53, thereby not really mitigating risk of cross-contamination.

Commented [PE7]: Compare with section in Exec Summary

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that 'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...' Please revisit and clarify for consistency.

Page 92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites", exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Commented [PE8]: Not really recommendation – DFO Science stated this in triploidy Science Response (p.g 9).

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: "In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality." is misleading unclear as only one intense winter could be problematic. A recent example is the wintersuperchill event in 2014 which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past

Commented [PE9]: Is this risk to individual fish or environmental risk?

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland shelf) region?

Page 100. "A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Commented [PE10]: Do we have a reference?

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment is lacking in detail and seems overly optimistic that there would be little to no problems. The "assessment" is thin.

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Section 3.0 – Effects Assessment Methodology

Page 128. Economy: Training, Employment and Business is not a "VEC" in the conventional context of an EIS. This information is acceptable from an economics context, but it does not belong in the ecological portions of the report. This pattern is repeated at several points in the document in Sections 3, 4, & 7.

Page 130. Project Area. The Marine Industrial Park may have runoff from the facilities located there under some scenarios, with a potential for runoff into the marine environment. However, there is no mention or evaluation of the potential for this outcome. It is difficult to believe the probability of this scenario is zero, as the wording in the text implies.

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Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 130. Study Area. It states that *"The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA"* and that *"This is considered the maximum extent wherein there is potential for effects of the Project to occur..."* Although the EA Committee felt it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

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Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Commented [PE12]: Need to reword as potential for wild salmon to be impacted outside study area. Proponent shouldn't say "maximum extent" as it gives impression effects will ONLY happen within study area. We have evidence to suggest impact may happen outside study area as salmon do leave PB and may interact with wild salmon.

Even if fish don't escape, could send disease to other salmon from Mar, Gif, etc as they do enter the Bay. Need to get reference from Ian.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Location of Rivers. The document states that *"...the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site"*, whereas earlier in the EIS (p. 96) it states that *"the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* Please revisit and clarify for consistency.

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled over the years, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

modeling of the area, published by Ma et al. (2012) is not even referenced. Appendix D (Fish and Fish Habitat Component Study) states: "Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important." This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. Using tides only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle) but a longer time-series is necessary to be representative. Wind forcing and the Labrador Current are variable on a timescale of days to seasons; again implying the need for long time-series. Consequently, the data collected for this study and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

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Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e., not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

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Page 145. Flood and Tidal Zones. "During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights." A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources (e.g. xox). For example: <http://navigator.oceansdata.ca/public/>

Commented [PE14]: Follow up with Sebastien

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability would be helpful and should be provided in these figures.

Commented [PE15]: How do we cite this?

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around

Commented [PE16]: Get reference from Cynthia

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;

2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where ~~this data is~~ these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this is already known from studies performed in Placentia Bay (see Matheson et al. 2016). The evidence for this is rather conclusive and well documented, and the supporting paper has been published for two years. ~~The proponent should not cite "pers. comm."~~ sources when published accounts from the area are readily available.

~~Additionally, why present information about eelgrass restoration only?~~ Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014).

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is ~~considered as a concern or not~~.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. ~~It would be helpful if h~~ Habitat should be ~~was~~ discussed at a larger spatial scale using existing information (see XXX).

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also clearly indicated that with respect to sSouth Newfoundland, had the analysis extended back just one (1) single year (i.e.: over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador NL. A retrospective analysis of salmon returns to Conne River for the years 1976-1985 (10-year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 four years of the fish counting fence operation (1986-1989) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided ~~here~~.

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Commented [PE18]: Follow up with Aquaculture Section re. references if we need to obtain more data outside of 100 m (100 m was decided based on DFO Science previous suggestions on footprint).

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least ~~one year or more~~ two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al., 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion is ~~weak~~ requires more discussion and ~~is~~ missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps ~~regarding cumulative effects are also significant~~ regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged and addressed. Water structure seasonality (i.e.: temperature and salinity) are also data gaps that still need to be addressed, particularly salinity.

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.

Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification." The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; how is the term "adequate" defined in this context?

Page 352. Algal Blooms. This section of document cites DFO 2010c many times (almost the only reference and the source of the Harmful Algal Bloom (HAB) map). This is not included in the references and the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. The information appears to be correct, although likely a little underestimated, as the finfish aquaculture industry on the south coast considers HABs a concern, and it is certainly a major issue in BC-British Columbia with increasing concern in the NL Region.

The document refers to the potential for toxic algal blooms but states that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, Greig salmon farms in British Columbia recently lost 250,000 salmon owing to toxic algae.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, simply lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant (NS), yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "NS not significant".

Commented [PE20]: Not in reference list

Is this the correct reference?

LGL. 2018. Wild Atlantic Salmon. Component Study for the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project. LGL Rep. FA0144-1. Rep. by LGL Limited, St. John's, NL for Grieg NL, Marystown, NL. 71 p. + appendix.

Commented [PE21]: Can be found in following references:
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Commented [PE22]: Get new wording from Sebastien

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Commented [PE23]: Despite concern in BC and other areas in the world – increasing concern due to trend ... but has not yet been seen to date in NL.

Main point is that there is increasing concern.

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. entirely too short) the estimated benthic loading of carbon provided in this section ~~cannot really be trusted~~ may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO AAR (Aquaculture Activities Regulations) (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Commented [PE24]: Monitoring isn't a mitigation measure (feeds into compliance).

Explain how usage of tools will demonstrate the issue and then what mitigation measures they would take to address issue (e.g. follow AAR rules)

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European*

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

salmon and wild Newfoundland salmon." There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc... The document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be replaced with 'commonly'-deleted.

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, yet nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that a lot many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The authors seem to be mixing up juvenile and adult surveys. Also "older individuals" is not correct; these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 survey either. Interestingly, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. There is a statement: *"...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon."* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

Commented [PE25]: Ian to send reference

Commented [PE26]: Reword and say that Proponent needs to clarify

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Commented [PE27]: Yes it would have a large effect (e.g. only 20,000 wild salmon on south coast and a 160,000 escape of farmed fish would have a significant effect).

e.g. highly unlikely that an escape of this magnitude would not have a large effect

their confidence level is incorrect

Commented [PE28]: Shouldn't this be higher?

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

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Page 476. Accidental Events. Again, Sampling would involve collecting and analyzing blood samples. Many monitoring of impacts would likely be undertaken by DFO in collaboration with Greig-Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the ~~WS-wild salmon~~ VEC were predicted to be not significant". While the proponent has outlined in detail the various mitigation measures that will be implemented, many of which are to be commended, a more realistic conclusion could be: Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Commented [PE29]: What was in EA guidelines regarding requirement to collect baseline data?

Need longer time-series to determine how effective Proponent's deposition modelling is.

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~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

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There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

Commented [PE30]: We're making conclusions on the Project and the aquaculture industry and not the EA itself. Need to ensure we are not making wide sweeping statements and stick to scope

Revision to para 1: Proponent can't say non-significant effect due to data and reasons stated above.

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7.9.2 Accidents and Malfunctions

Page 480. It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it would be low.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect 'alter genetic integrity...' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never

Commented [PE31]: Suggest now including Garnish 2017 returns. (which should be published in SAR this week).

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are ~~multi-sea-winter salmon (MSW)~~.

Page 5. It states that *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of ~~our~~ the Department's counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents and this information should be reported and discussed in the EIS.

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey"*. This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.,

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data ~~is~~ are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that "if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented." This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful mainly because a recapture plan wasn't in place due to operational and environmental issues which resulted in delays in initiating recapture efforts.

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Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. "Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: "*siting of sea cages at locations with suitable currents and depth to distribute organic waste*", which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Greig-Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it a one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Page 8. The basis for using 1,124 kg/cage/day feed input is not clear. Is it the maximum load (worst case scenario as requested by AAR) or something else?

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. "*The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track.*" The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 36. "In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay." A reference should be provided here and where other such statements are made. For example the statement that follows: "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."

Page 36. "Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters." This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (page 5) states: "There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."

Page 36. Please provide references for the datasets that have already been documented (e.g. MUN Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. "At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m." It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference, Mooring name?). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Conclusions

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- The ocean current time-series used for this study are too short to give statistically robust/satisfactory estimates of dispersion.

Commented [PE32]: Not in reference list

Are these the correct references:

Hart, S.R., Blusztajn, J., Dick, H.J.B., Meyer, P.S. and Muehlenbachs, K. (1999). The fingerprint of seawater circulation in a 500-meter section of ocean crust gabbros. *Geochimica et Cosmochimica Acta* 63: 4,059-4,080 with this as hyperlink: <https://earthref.org/ERR/n:19,b:aaaa0000019tab09/>

Schillinger, D.J., DeYoung, B., and J. Foley. 2000. CTD data from the Newfoundland coast: 1986 and 1987. *Dept. Physics and Physical Oceanography, Memorial University*. 31 p.

Commented [PE33]: Change "misleading" to "inaccurate"

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate and misleading statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. This is unlikely. The data does not support this conclusion.

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The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each BMA site) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the proponent;

- As the Environmental Effects Monitoring and Follow-up Program (EEMP) has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Griseig NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.
Newfoundland and Labrador Region

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Approved by

B. R. McCallum
Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

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DRAFT

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This Report is Available from the

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MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci. 2018/nnn.

Johnson, Roger

From: Johnson, Roger
Sent: Monday, June 25, 2018 4:47 PM
To: Kelly, Jason
Subject: Re: grieg call me [REDACTED] to discuss

Meeting went better than expected. Thanks to Chris [REDACTED]

Another draft of the review will be done by Wednesday it should be much better.

No problem call me tommorrow and glad to help on Friday

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Kelly, Jason
Sent: Monday, June 25, 2018 3:57 PM
To: Johnson, Roger
Subject: RE: grieg call me [REDACTED] to discuss

Ok... I just wanted to send Ray a note this even, re: results of the CSAS meeting today and our perspectives.

We can have a detailed chat tomorrow perhaps when you driving. Ray and I, have a meeting scheduled with Jackie on Friday at 10:00am to update her. I'd like you to attend that as well

jas

From: Johnson, Roger
Sent: June-25-18 3:53 PM
To: Kelly, Jason
Subject: Re: grieg call me [REDACTED] to discuss

Still in meeting

8pages lrft

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Kelly, Jason
Sent: Monday, June 25, 2018 3:51 PM
To: Johnson, Roger
Subject: grieg call me [REDACTED] to discuss

Jason

s.16(2)(c)

s.19(1)

Greig SRP

Date June 25/18

Biosecurity
mit.
measures

SOPs for disinfection

if outbreak, visit from CFIA & prov on SOPs.

→ A1 - edit "e.g.'s"

- Rous are not used widely in industry.

→ A1 - Dale's note on Donio's comment
on Exec summary?

- OR intro is still #1 threat in Norway,
triploid is major component

↳ triploid must still make up
small proportion of supply

• proportion of diploids / triploids in cages
vs fresh water.

note from Bob - older ref's ok, but need new
ones if avail - esp for PB area.

→ A1 - check if Bay of Fundy is in doc.

→ A1 Bentley⁽²⁰⁰⁶⁾ on et. al citation?

wouldn't be recommended in areas of
hypoxia due to

- proponent is saying ^{the} seasonal
sites won't see a winter (big
fish) 1 other 9 sites will only see
1 winter.

A1 → fix # of e.g. 1 vs one

A1 → "Proponent" vs "proponent"
"Project" vs "project"

"time-feeder" vs "time feeder"

- Revised draft to group on wed
~~back~~ COB from ppt on wed w/
quick turnaround.

Richards, Dale E

De: Hamoutene, Dounia
Envoyé: June-26-18 9:20 AM
À: Parrill, Erika
Cc: Richards, Dale E; Meade, James
Objet: RE: Updated Grieg Science Response
Pièces jointes: DRAFT Grieg PB Aquaculture EIS SRR - Tracked Changes-DH.docx

Hi all

Added a sentence on the benthic habitat portion but in reality this is a bit of a stretch considering industry has actually followed guidelines of AAR in term of these data collection. I have tried to use the "recommendation" card to request more descriptive benthic data but in all honesty I am actually not sure we can request that. We can discuss further this particular notion

Thank you

Cheers

Dounia

From: Parrill, Erika
Sent: June-25-18 4:31 PM
To: Gregory, Robert; Hamoutene, Dounia; Donnet, Sebastien G; Ratsimandresy, Andry; Dalley, Kate L; Grant, Carole; Bradbury, Ian R; Hendry, Christopher; McKenzie, Cynthia
Cc: Richards, Dale E; Meade, James
Subject: Updated Grieg Science Response

Hello,

Please see attached for the updated Grieg Science Response from today's meeting.

If you could review the attached comment bubbles and provide the outstanding information to me by CoB Tuesday it would be greatly appreciated. Plan is then to send a new version to everyone to review on Wednesday with a very quick turnaround.

Cheers,

Erika

><((()))> . . . ><((()))> . . . ><((()))> . . . ><((()))> . . . ><((()))> . . . ><((()))>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Ecosystems and
Oceans Science

Sciences des écosystèmes
et des océans

Newfoundland and Labrador Region

Canadian Science Advisory Secretariat
Science Response 2018/nnn

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that DFO Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment ~~website at the following link:~~

<http://www.mae.gov.nl.ca/env-assessment/projects/Y2016/1834/index.html>

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 – Project Rationale
 - Section 2.4.3 – Land-based Facility (RAS hatchery)
 - Section 2.4.4 – Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 – Physical Environment
 - Section 4.2.3 – Fish and Fish Habitat
 - Section 4.2.4 – Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat ~~VEC~~ Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 – Wild Salmon VEC
 - Section 7.9.2 – Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret, likely due to the experience of the proponent with this type of project. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties, associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation.

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics/routes. Additional information is required on mitigation measures for biosecurity risks and invasive species. This seems contrary to the purpose of creating BMAs.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by an remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. What frequency will the ROV monitor the cages (e.g., monthly monitoring, ROV to be shared between BMAs)? Daily?

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the

Mis en forme : Français (France)

Commentaire [PE1]: Erika to follow-up with Sebastien regarding gear, SOPs for others in area

Mis en forme : Français (France), Surlignage

Mis en forme : Surlignage

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee felt it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1992). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information/-estimate.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Please confirm/-clarify.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 11. The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay. Although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US market, notwithstanding the potential impacts it could have on local fisheries resources, particularly Atlantic Salmon.

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased

Mis en forme : Surlignage

Commentaire [PE2]: Triploids are not widely used in Norway
Introgression is #1 threat in Norway

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Mis en forme : Surlignage

Page 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)."* The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reconsidered.

Commentaire [PE3]: Not in reference list

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Tlusty. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

Commentaire [PE4]: Not in reference list

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern."* As stated previously, this may not apply to all BMAs.

Commentaire [PE5]: Concern because of baseline data and should be reviewed during NL site licensing process

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater"*, however, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 - Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used, ~~yet~~.

Page 45. It states that ~~Greig-Grieg~~ NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts wouldn't be recommended in areas of hypoxia due to

Mis en forme : Surlignage

Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. "Typically once a year, ~~Greig-Grieg~~ NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..." This would imply that all nets are replaced approximately every year. Please revisit and confirm and explain why once a year.

Mis en forme : Surlignage

Page 64. "If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats." Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/-commitment to use well boats for this purpose, as ~~Grieg~~ NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? There should also be some discussion regarding the transfer of pathogens/disease from lumpfish to salmon.

The stock origin of the lumpfish (cleaner fish) is not clear. ~~Also, the density of lumpfish (i.e., 46,000 per cage) appears very high.~~ This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. "Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated." These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. While it is assumed that Grieg staff are experienced in this process, examples of past successful transfers and rates of accident/losses would also be useful in this context.

Commentaire [PE6]: Comparison with SOPs

Mis en forme : Barré

Mis en forme : Surlignage

Page 76. "The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination." It is unclear how this will be achieved as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/-disembarkation within a given BMA are not sufficient

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

as pathogens could be present in a given BMA and then transmitted to another BMA. The proposed logistics seem contrary to the purpose of creating BMAs. Relatedly, on page 98: "Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Fort or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." However, they will use the routes crossing BMAs, as shown in Figure 2.53, thereby not really mitigating risk of cross-contamination.

Commentaire [PE7]: Compare with section in Exec Summary

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that 'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...' Please revisit and clarify for consistency.

Page 92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites", exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Commentaire [PE8]: Not really recommendation – DFO Science stated this in triploidy Science Response (p.g 9).

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: "In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality" is misleading unclear as only one intense winter could be problematic. A recent example is the wintersuperchill event in 2014 which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past

Commentaire [PE9]: Is this risk to individual fish or environmental risk?

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland shelf) region?

Page 100. "A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The [Canadian Food Inspection Agency \(CFIA\)](#) website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Commentaire [PE10]: Do we have a reference?

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment is lacking in detail and seems overly optimistic that there would be little to no problems. The "assessment" is thin.

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Section 3.0 – Effects Assessment Methodology

Page 128. Economy: Training, Employment and Business is not a "VEC" in the conventional context of an EIS. This information is acceptable from an economics context, but it does not belong in the ecological portions of the report. This pattern is repeated at several points in the document in Sections 3, 4, & 7.

Page 130. Project Area. The Marine Industrial Park may have runoff from the facilities located there under some scenarios, with a potential for runoff into the marine environment. However, there is no mention or evaluation of the potential for this outcome. It is difficult to believe the probability of this scenario is zero, as the wording in the text implies.

Commentaire [PE11]: Check with author to possibly delete. Need to change tone of paragraph

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 130. Study Area. It states that *"The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA"* and that *"This is considered the maximum extent wherein there is potential for effects of the Project to occur..."* Although the EA Committee felt it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

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Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Commentaire [PE12]: Need to reword as potential for wild salmon to be impacted outside study area. Proponent shouldn't say "maximum extent" as it gives impression effects will ONLY happen within study area. We have evidence to suggest impact may happen outside study area as salmon do leave PB and may interact with wild salmon.

Even if fish don't escape, could send disease to other salmon from Mar, Gif, etc as they do enter the Bay. Need to get reference from Ian.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Location of Rivers. The document states that *"...the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site"*, whereas earlier in the EIS (p. 96) it states that *"the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* Please revisit and clarify for consistency.

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled over the years, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

modeling of the area, published by Ma et al. (2012) is not even referenced. Appendix D (Fish and Fish Habitat Component Study) states: "Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important." This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. Using tides only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle) but a longer time-series is necessary to be representative. Wind forcing and the Labrador Current are variable on a timescale of days to seasons; again implying the need for long time-series. Consequently, the data collected for this study and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Commentaire [PE13]: Follow up with Andry

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Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/ or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

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Page 145. Flood and Tidal Zones. "During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights." A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources (e.g. xxx). For example: <http://navigator.oceansdata.ca/public/>

Commentaire [PE14]: Follow up with Sebastien

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability would be helpful and should be provided in these figures.

Commentaire [PE15]: How do we cite this?

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around

Commentaire [PE16]: Get reference from Cynthia

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;

2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where ~~this data is~~ these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this is already known from studies performed in Placentia Bay (see Matheson et al. 2016). The evidence for this is rather conclusive and well documented, and the supporting paper has been published for two years. The proponent should not cite "pers. comm." sources when published accounts from the area are readily available.

Additionally, why present information about eelgrass restoration only? Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014).

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is ~~considered as a concern or not~~.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites as prescribed by AAR protocols. ~~It would be helpful if h~~ Habitat should be was discussed at a larger spatial scale using existing information and additional video data collection (see XXX). This is recommended in the light of the lease sizes and the proximity of sites to MPAs, and the overall potential cumulative effect of deposition when stocking will begin. It is also advisable in the light of the significant depth ranges at sites that more video data is gathered to better describe all depth related changes.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also ~~clearly~~ indicated that with respect to sSouth Newfoundland, had the analysis extended back just one (1) single year (i.e.: over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador NL. A retrospective analysis of salmon returns to Conne River for the years 1976—1985 (10-year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 ~~four~~ years of the fish counting fence operation (1986—1989) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught)

Commentaire [PE17]: Proponent needs to clarify. Need to reword with Kate

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Commentaire [PE18]: Follow up with Aquaculture Section re. references if we need to obtain more data outside of 100 m (100 m was decided based on DFO Science previous suggestions on footprint).

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided here.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least ~~one year or more~~ two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al., 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion ~~is weak~~ requires more discussion and ~~is~~ missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps ~~regarding cumulative effects are also significant~~ regarding cumulative effects. The BMAs will not be fallowed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged and addressed. Water structure seasonality

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

(i.e.: temperature and salinity) are also data gaps that still need to be addressed, particularly salinity.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.

Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or eutrophication." The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; how is the term "adequate" defined in this context?

Page 352. Algal Blooms. This section of document cites DFO 2010c many times (almost the only reference and the source of the Harmful Algal Bloom (HAB) map). This is not included in the references and the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. The information appears to be correct, although likely a little underestimated, as the finfish aquaculture industry on the south coast considers HABs a concern, and it is certainly a major issue in BC-British Columbia with increasing concern in the NL Region.

The document refers to the potential for toxic algal blooms but states that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, Greig salmon farms in British Columbia recently lost 250,000 salmon owing to toxic algae.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, simply lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant (NS), yet the proponent has assigned a moderate level of

Commentaire [PE19]: Main issues: #1 – ocean currents; #2 - salinity

Commentaire [PE20]: Not in reference list

Is this the correct reference?

LGL. 2018. Wild Atlantic Salmon. Component Study for the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project. LGL Rep. FA0144-1. Rep. by LGL Limited, St. John's, NL for Grieg NL, Marystown, NL. 71 p. + appendix.

Commentaire [PE21]: Can be found in following references: xxx

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Commentaire [PE22]: Get new wording from Sebastien

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Commentaire [PE23]: Despite concern in BC and other areas in the world – increasing concern due to trend ... but has not yet been seen to date in NL.

Main point is that there is increasing concern.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "NSnot significant".

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. entirely too short) the estimated benthic loading of carbon provided in this section cannot really be trusted may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)." They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.*

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO AAR (Aquaculture Activities Regulations) (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more*

Commentaire [PE24]: Monitoring isn't a mitigation measure (feeds into compliance).

Explain how usage of tools will demonstrate the issue and then what mitigation measures they would take to address issue (e.g. follow AAR rules)

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

economic benefit. It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc... The document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic ~~Salmon~~ escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be replaced with 'commonly'-deleted.

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence", yet nonetheless* escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that ~~a lot many~~ of the salmon rivers on the south coast of Newfoundland ~~are small and~~ have low abundances.

Page 436. The authors seem to be mixing up juvenile and adult surveys. Also "older individuals" is not correct; these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 survey either. Interestingly, DFO continues to encounter farmed escapes at its monitoring facility in Gamish, even though the nearest aquaculture site is 40-50 km away.

Page 439. There is a statement: *"...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon."* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

Commentaire [PE25]: Ian to send reference

Commentaire [PE26]: Reword and say that Proponent needs to clarify

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Commentaire [PE27]: Yes it would have a large effect (e.g. only 20,000 wild salmon on south coast and a 160,000 escape of farmed fish would have a significant effect).

e.g. highly unlikely that an escape of this magnitude would not have a large effect

their confidence level is incorrect

Commentaire [PE28]: Shouldn't this be higher?

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

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Page 476. Accidental Events. Again, Sampling would involve collecting and analyzing blood samples. Many monitoring of impacts would likely be undertaken by DFO in collaboration with Greig-Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the WS wild salmon VEC were predicted to be not significant". While the proponent has outlined in detail the various mitigation measures that will be implemented, many of which are to be commended, a more realistic conclusion could be: Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Commentaire [PE29]: What was in EA guidelines regarding requirement to collect baseline data?

Need longer time-series to determine how effective Proponent's deposition modelling is.

Mis en forme : Surlignage

Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.

Mis en forme : Barré

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

Commentaire [PE30]: We're making conclusions on the Project and the aquaculture industry and not the EA itself. Need to ensure we are not making wide sweeping statements and stick to scope

Revision to para 1: Proponent can't say non-significant effect due to data and reasons stated above.

Mis en forme : Surlignage

7.9.2 Accidents and Malfunctions

Page 480. It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it would be low.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect 'alter genetic integrity....' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never

Commentaire [PE31]: Suggest now including Gamish 2017 returns. (which should be published in SAR this week).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are ~~multi-sea-winter-salmon (MSW)~~.

Page 5. It states that *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of ~~our~~ the Department's counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents and this information should be reported and discussed in the EIS.

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey"*. This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data ~~is~~are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful ~~mainly because a recapture plan wasn't in place, due to operational and environmental issues~~ which resulted in delays in initiating recapture efforts.

Mis en forme : Surlignage

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."*

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: "*siting of sea cages at locations with suitable currents and depth to distribute organic waste*", which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Greig-Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it a one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Page 8. The basis for using 1,124 kg/cage/day feed input is not clear. Is it the maximum load (worst case scenario as requested by AAR) or something else?

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e.: prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. "*The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track.*" The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 36. "In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay." A reference should be provided here and where other such statements are made. For example the statement that follows: "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."

Page 36. "Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters." This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (page 5) states: "There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."

Page 36. Please provide references for the datasets that have already been documented (e.g. MUN Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. "At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m." It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference? Mooring name?). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Conclusions

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- The ocean current time-series used for this study are too short to give statistically robust/satisfactory estimates of dispersion.

Commentaire [PE32]: Not in reference list

Are these the correct references:

Hart, S.R., Blusztajn, J., Dick, H.J.B., Meyer, P.S. and Muehlenbachs, K. (1999). The fingerprint of seawater circulation in a 500-meter section of ocean crust gabbros. *Geochimica et Cosmochimica Acta* 63: 4,059-4,080 with this as hyperlink: <https://earthref.org/ERR/n:19,b:aaaa0000019tab09/>

Schillinger, D.J., DeYoung, B., and J. Foley. 2000. CTD data from the Newfoundland coast: 1986 and 1987. Dept. Physics and Physical Oceanography, Memorial University. 31 p.

Commentaire [PE33]: Change "misleading" to "inaccurate"

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate and misleading statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. This is unlikely. The data does not support this conclusion.

Mis en forme : Surlignage

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each BMA site) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the proponent;

- As the Environmental Effects Monitoring and Follow-up Program (EEMP) has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Griseig NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

Contributors

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Newfoundland and Labrador Region **Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.**

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Erika Parrill	DFO Centre for Science Advice
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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Approved by

B. R. McCallum
Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

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Newfoundland and Labrador Region

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*MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page
couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.*

Dounia

Hello,

Please see attached for the updated Grieg Science Response from today's meeting.

If you could review the attached comment bubbles and provide the outstanding information to me by CoB Tuesday it would be greatly appreciated. Plan is then to send a new version to everyone to review on Wednesday with a very quick turnaround.

Cheers,
Erika

$\rightarrow \langle (((\langle \rangle))) \rightarrow \langle (((\langle \rangle))) \rightarrow \langle (((\langle \rangle))) \rightarrow \langle (((\langle \rangle))) \rightarrow \langle (((\langle \rangle)))$

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White, Terrena

From: Bradbury, Ian R
Sent: June-26-18 10:59 AM
To: Grant, Carole
Cc: Dempson, Brian
Subject: EIS
Attachments: Prevalence_of_piscine_orthoreovirus_and_salmonid_a.pdf; Glover2016_Article_GeneticScreeningOfFarmedAtlant-2.pdf; DRAFTGriegPBAquacultureEISSRRTrackedChanges_IRB.docx

I have inserted the requested references and attached both papers here as well.

Ian

ORIGINAL ARTICLE

Prevalence of piscine orthoreovirus and salmonid alphavirus in sea-caught returning adult Atlantic salmon (*Salmo salar* L.) in northern Norway

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Abstract

Heart and skeletal muscle inflammation (HSMI) caused by piscine orthoreovirus (PRV) and pancreas disease (PD) caused by salmonid alphavirus (SAV) are among the most prevalent viral diseases of Atlantic salmon farmed in Norway. There are limited data about the impact of disease in farmed salmon on wild salmon populations. Therefore, the prevalence of PRV and SAV in returning salmon caught in six sea sites was determined using real-time RT-PCR analyses. Of 419 salmon tested, 15.8% tested positive for PRV, while none were positive for SAV. However, scale reading revealed that 10% of the salmon had escaped from farms. The prevalence of PRV in wild salmon (8%) was significantly lower than in farm escapees (86%), and increased with fish length (proxy for age). Sequencing of the S1 gene of PRV from 39 infected fish revealed a mix of genotypes. The observed increase in PRV prevalence with fish age and the lack of phylogeographic structure of the virus could be explained by virus transmission in the feeding areas. Our results highlight the need for studies about the prevalence of PRV and other pathogens in Atlantic salmon in its oceanic phase.

KEYWORDS

aquaculture, piscine orthoreovirus, salmonid alphavirus, wild salmon

1 | INTRODUCTION

Viral diseases represent a serious problem in Atlantic salmon (*Salmo salar* L.) farming in Norway, often leading to substantial economic losses. Heart and skeletal muscle inflammation (HSMI) and pancreas disease (PD) are among the most common viral diseases in Norwegian aquaculture, with 101 and 138 cases, respectively, reported in 2016 (Hjeltnes, Bornø, Jansen, Haukaas, & Walde, 2017). PD caused by salmonid alphavirus (SAV) is endemic in salmon farmed in central and western Norway, but uncommon in northern Norway. In contrast, HSMI caused by piscine orthoreovirus (PRV) is widespread in Norwegian salmon farms along the Norwegian

coastline (Kristoffersen, Bang Jensen, & Jansen, 2013; Wessel et al., 2017).

Disease outbreaks in salmon farms may lead to increased infection and disease risks at neighbouring farms and in wild fish populations, and there is an increasing public concern of disease impacting wild salmon populations in Norway (Svåsand et al., 2017). Data are collected annually on the frequency and geographical distribution of disease outbreaks in fish farms (Hjeltnes et al., 2017). Correlating such data from regions differing in farming intensities and disease profiles with pathogen prevalence in local wild salmon populations would thus help to address this concern. However, pathogen prevalence data alone as an indicator of infection pressure have

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ORIGINAL PAPER

Genetic screening of farmed Atlantic salmon escapees demonstrates that triploid fish display reduced migration to freshwater

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Abstract Each year, hundreds of thousands of farmed Atlantic salmon escape from fish farms into the wild. Some of these escapees enter freshwater, and manage to interbreed with native populations. To hinder further genetic introgression in native populations, the use of sterile triploid salmon within commercial aquaculture is being examined. However, if triploid escapees migrate into freshwater, they may still have ecological impacts on local populations. In the present study, we used microsatellite DNA genotyping to determine the ploidy of 3794 farmed escapees captured in 17 Norwegian rivers in the period 2007–2014. Although a previous study has reported an average of 2 % triploids in Norwegian fish farms during this exact period, here, we only observed 7 (0.18 %) triploids among the escapees captured in

freshwater. In addition, we identified three trisomic escapees. For the triploids where the within-river capture location was determined, they were only observed in the lower reaches and not on the spawning grounds. It is concluded that propensity for triploid Atlantic salmon to migrate into freshwater following escape from a fish farm is significantly lower than for normal diploid salmon escapees. Therefore, commercial production of triploids should not only be seen as an effective way of stopping genetic introgression, it will also significantly reduce the numbers of escapees entering rivers, which in turn limits ecological interactions and potential disease transmission.

Keywords Farming · Genetic · Environment · Monitoring · Trisomy · Aquaculture

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Introduction

The Atlantic salmon (*Salmo salar* L.) aquaculture industry has a number of environmental challenges, of which farmed escapees and their potential genetic interaction with wild conspecifics represents one of the most significant (Taranger et al. 2015). Each year, hundreds of thousands of farmed salmon escape into the wild. While many of these disappear never to be seen again (Skilbrei et al. 2015a), some enter freshwater and spawn with wild salmon (Lura and Saegrov 1991; Saegrov et al. 1997). As a result, genetic

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Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that DFO Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment website at the following link:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 - Project Rationale
 - Section 2.4.3 - Land-based Facility (RAS hatchery)
 - Section 2.4.4 - Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 - Physical Environment
 - Section 4.2.3 - Fish and Fish Habitat
 - Section 4.2.4 - Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat VEC Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 - Wild Salmon VEC
 - Section 7.9.2 - Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret, likely due to the experience of the proponent with this type of project. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties, associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation.

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics/routes. Additional information is required on mitigation measures for biosecurity risks and invasive species. This seems contrary to the purpose of creating BMAs.

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Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by an remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. What frequency will the ROV monitor the cages (e.g., monthly monitoring, ROV to be shared between BMAs)? Daily?

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Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee felt it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 19892). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to

Commented [B2]: S. Madhun A, Isachsen C H, Omdal L M, Einen A C B, Mæhle S, Wennevik V, Niemelä E, Svåsand T, and Karlsbakk E. 2018. Prevalence of piscine orthoreovirus and salmonid alphavirus in sea-caught returning adult Atlantic salmon (*Salmo salar* L.) in northern Norway. *Journal of Fish Diseases* 41 (5):797-803.

Newfoundland and Labrador Region

be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information/-estimate.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Please confirm/-clarify.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 11. The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay. Although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US market, notwithstanding the potential impacts it could have on local fisheries resources, particularly Atlantic Salmon.

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased

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Commented [PE3]: Triploids are not widely used in Norway
Introgression is #1 threat in Norway

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

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Page 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Commented [PE4]: Not in reference list

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Tlusty. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

Commented [PE5]: Not in reference list

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)."* The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reconsidered.

Commented [PE6]: Concern because of baseline data and should be reviewed during NL site licensing process

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern."* As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater"*, however, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used. ~~yet.~~

Page 45. It states that Greig Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts wouldn't be recommended in areas of hypoxia due to ...

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Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. "Typically once a year, Greig Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..." This would imply that all nets are replaced approximately every year. Please revisit and confirm and explain why once a year.

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Page 64. "If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established *Standard Operating Procedures* (SOP). This would likely involve the use of well boats." Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? There should also be some discussion regarding the transfer of pathogens/disease from lumpfish to salmon.

The stock origin of the lumpfish (cleaner fish) is not clear. Also, ~~the density of lumpfish (i.e., 16,000 per cage) appears very high.~~ This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. "Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated." These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. While it is assumed that Grieg staff are experienced in this process, ~~examples of past successful transfers and rates of accident/losses would also be useful in this context.~~

Commented [PE7]: Comparison with SOPs

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Page 76. "The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination." It is unclear how this will be achieved as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

as pathogens could be present in a given BMA and then transmitted to another BMA. The proposed logistics seem contrary to the purpose of creating BMAs. Relatedly, on page 98: "Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." However, they will use the routes crossing BMAs, as shown in Figure 2.53, thereby not really mitigating risk of cross-contamination.

Commented [PE8]: Compare with section in Exec Summary

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that "typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..." Please revisit and clarify for consistency.

Page 92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites", exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Commented [PE9]: Not really recommendation – DFO Science stated this in triploidy Science Response (p.g 9).

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: "In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality" is misleading unclear as only one intense winter could be problematic. A recent example is the wintersuperchill event in 2014 which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past

Commented [PE10]: Is this risk to individual fish or environmental risk?

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland shelf) region?

Page 100. *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated."* These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The [Canadian Food Inspection Agency \(CFIA\) website](#) indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Commented [PE11]: Do we have a reference?

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment is lacking in detail and seems overly optimistic that there would be little to no problems. The "assessment" is thin.

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Section 3.0 – Effects Assessment Methodology

Page 128. Economy: Training, Employment and Business is not a "VEC" in the conventional context of an EIS. This information is acceptable from an economics context, but it does not belong in the ecological portions of the report. This pattern is repeated at several points in the document in Sections 3, 4, & 7.

Page 130. Project Area. The Marine Industrial Park may have runoff from the facilities located there under some scenarios, with a potential for runoff into the marine environment. However, there is no mention or evaluation of the potential for this outcome. It is difficult to believe the probability of this scenario is zero, as the wording in the text implies.

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 130. Study Area. It states that *"The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA"* and that *"This is considered the maximum extent wherein there is potential for effects of the Project to occur..."* Although the EA Committee felt it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

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Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Commented [PE13]: Need to reword as potential for wild salmon to be impacted outside study area. Proponent shouldn't say "maximum extent" as it gives impression effects will ONLY happen within study area. We have evidence to suggest impact may happen outside study area as salmon do leave PB and may interact with wild salmon.

Even if fish don't escape, could send disease to other salmon from Mar, Gif, etc as they do enter the Bay. Need to get reference from Ian.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Location of Rivers. The document states that *"...the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site"*, whereas earlier in the EIS (p. 96) it states that *"the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* Please revisit and clarify for consistency.

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled over the years, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

modeling of the area, published by Ma et al. (2012) is not even referenced. Appendix D (Fish and Fish Habitat Component Study) states: "Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important." This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. Using tides only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle) but a longer time-series is necessary to be representative. Wind forcing and the Labrador Current are variable on a timescale of days to seasons; again implying the need for long time-series. Consequently, the data collected for this study and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

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Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e., not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/ or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

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Page 145. Flood and Tidal Zones. "During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights." A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources (e.g. xxx). For example: <http://navigator.oceansdata.ca/public/>

Commented [PE15]: Follow up with Sebastien

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability would be helpful and should be provided in these figures.

Commented [PE16]: How do we cite this?

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around

Commented [PE17]: Get reference from Cynthia

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;

2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where ~~this data is~~ these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this is already known from studies performed in Placentia Bay (see Matheson et al. 2016). The evidence for this is rather conclusive and well documented, and the supporting paper has been published for two years. The proponent should not cite "pers. comm." sources when published accounts from the area are readily available.

Additionally, why present information about eelgrass restoration only? Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014).

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is ~~considered as a concern or not~~.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if h~~Habitat should be~~was discussed at a larger spatial scale using existing information (see XXX).

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also ~~clearly~~ indicated that with respect to ~~s~~South Newfoundland, had the analysis extended back just one (1) single year (i.e.: over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and Labrador NL. A retrospective analysis of salmon returns to Conne River for the years 1976—1985 (10-year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4 ~~four~~ years of the fish counting fence operation (1986—1989) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided ~~here~~.

Commented [PE18]: Proponent needs to clarify. Need to reword with Kate

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Commented [PE19]: Follow up with Aquaculture Section re. references if we need to obtain more data outside of 100 m (100 m was decided based on DFO Science previous suggestions on footprint).

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Newfoundland and Labrador Region

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least ~~one year or more~~ two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al. 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion is ~~weak~~ requires more discussion and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. ~~Data gaps regarding cumulative effects are also significant~~ regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged and addressed. Water structure seasonality (i.e.: temperature and salinity) are also data gaps that still need to be addressed, particularly salinity.

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Commented [PE20]: Main issues: #1 – ocean currents; #2 – salinity

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Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.

Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or eutrophication." The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; how is the term "adequate" defined in this context?

Page 352. Algal Blooms. This section of document cites DFO 2010c many times (almost the only reference and the source of the Harmful Algal Bloom (HAB) map). This is not included in the references and the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. The information appears to be correct, although likely a little underestimated, as the finfish aquaculture industry on the south coast considers HABs a concern, and it is certainly a major issue in BC-British Columbia with increasing concern in the NL Region.

The document refers to the potential for toxic algal blooms but states that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, Greig salmon farms in British Columbia recently lost 250,000 salmon owing to toxic algae.

Commented [PE21]: Not in reference list

Is this the correct reference?

LGL. 2018. Wild Atlantic Salmon. Component Study for the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project. LGL Rep. FA0144-1. Rep. by LGL Limited, St. John's, NL for Grieg NL, Marystown, NL. 71 p. + appendix.

Commented [PE22]: Can be found in following references:
xxx

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Commented [PE23]: Get new wording from Sebastian

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Commented [PE24]: Despite concern in BC and other areas in the world – increasing concern due to trend ... but has not yet been seen to date in NL.

Main point is that there is increasing concern.

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Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, simply lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant (NS), yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "Not significant".

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. entirely too short) the estimated benthic loading of carbon provided in this section cannot really be trusted may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO AAR (Aquaculture Activities Regulations) (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Commented [PE25]: Monitoring isn't a mitigation measure (feeds into compliance).

Explain how usage of tools will demonstrate the issue and then what mitigation measures they would take to address issue (e.g. follow AAR rules)

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European*

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

salmon and wild Newfoundland salmon." There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc... The document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be replaced with 'commonly' deleted.

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, yet ~~nonetheless~~ escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that a ~~lot many~~ of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The authors seem to be mixing up juvenile and adult surveys. Also "older individuals" is not correct; these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 survey either. Interestingly, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. There is a statement: *"...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon."* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

Commented [PE26]: Ian to send reference

Glover, K. A., J. B. Bos, K. Urdal, A. S. Madhun, A. G. E. Sørvik, L. Unneland, B. B. Seliussen, Ø. Skaala, O. T. Skilbrei, Y. Tang, and V. Wennevik. 2016. Genetic screening of farmed Atlantic salmon escapes demonstrates that triploid fish display reduced migration to freshwater. *Biological Invasions* 18 (5): 1287-1294.

Commented [PE27]: Reword and say that Proponent needs to clarify

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Commented [PE28]: Yes it would have a large effect (e.g. only 20,000 wild salmon on south coast and a 160,000 escape of farmed fish would have a significant effect).

e.g. highly unlikely that an escape of this magnitude would not have a large effect

their confidence level is incorrect

Commented [PE29]: Shouldn't this be higher?

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

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Page 476. Accidental Events. Again, Sampling would involve collecting and analyzing blood samples. Many monitoring of impacts would likely be undertaken by DFO in collaboration with Greig Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the WS wild salmon VEC were predicted to be not significant". While the proponent has outlined in detail the various mitigation measures that will be implemented, many of which are to be commended, a more realistic conclusion could be: Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Commented [PE30]: What was in EA guidelines regarding requirement to collect baseline data?

Need longer time-series to determine how effective Proponent's deposition modelling is.

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~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

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There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

Commented [PE31]: We're making conclusions on the Project and the aquaculture industry and not the EA itself. Need to ensure we are not making wide sweeping statements and stick to scope

Revision to para 1: Proponent can't say non-significant effect due to data and reasons stated above.

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7.9.2 Accidents and Malfunctions

Page 480. It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it would be low.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect 'alter genetic integrity....' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Commented [PE32]: Suggest now including Gamish 2017 returns. (which should be published in SAR this week).

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are multi-sea-winter salmon (MSW).

Page 5. It states that *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of ~~our~~ the Department's counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents and this information should be reported and discussed in the EIS.

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey"*. This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence.

Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data is are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that "if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented." This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful mainly because a recapture plan wasn't in place due to operational and environmental issues which resulted in delays in initiating recapture efforts.

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Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. "Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."

Newfoundland and Labrador Region

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: "*siting of sea cages at locations with suitable currents and depth to distribute organic waste*", which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Greig-Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it a one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Page 8. The basis for using 1,124 kg/cage/day feed input is not clear. Is it the maximum load (worst case scenario as requested by AAR) or something else?

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e., prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. "*The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track.*" The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here and where other such statements are made. For example the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (pg. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. MUN-Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference, Mooring name?). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Conclusions

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- The ocean current time-series used for this study are too short to give statistically robust/satisfactory estimates of dispersion.

Commented [PE33]: Not in reference list

Are these the correct references:

Hart, S.R., Blusztajn, J., Dick, H.J.B., Meyer, P.S. and Muehlenbachs, K. (1999). The fingerprint of seawater circulation in a 500-meter section of ocean crust gabbros. *Geochimica et Cosmochimica Acta* 63: 4,059-4,080 with this as hyperlink: <https://earthref.org/ERR/n19,b:aaaa0000019lab09/>

Schillinger, D.J., DeYoung, B., and J. Foley. 2000. CTD data from the Newfoundland coast: 1986 and 1987. Dept. Physics and Physical Oceanography, Memorial University. 31 p.

Commented [PE34]: Change "misleading" to "inaccurate"

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate and misleading statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. This is unlikely. The data does not support this conclusion.

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The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each BMA site) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the proponent;

- As the Environmental Effects Monitoring and Follow-up Program (EEMP) has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

Contributors

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

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Approved by

B. R. McCallum
Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

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**Science Response: Placentia Bay Atlantic
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Newfoundland and Labrador Region

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Newfoundland and Labrador Region

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From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-20-18 2:43 PM
To: Grant, Carole
Subject: EIS review docs
Attachments: EIS Review.docx; 1834_eis_toc.pdf

As requested.

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**Pages 527 to / à 534
are duplicates of
sont des duplicatas des
pages 386 to / à 393**

Table of Concordance

Guideline Requirement		EIS	
Section	Title	Vol. / Section	Title
Executive Summary			
	Executive Summary	Vol. 1	Executive Summary
	Table of Concordance	Vol. 1	Table of Concordance
Section 1: Introduction			
1.1	Name of the Undertaking	Vol. 1 1.0	Introduction
1.2	The Proponent	Vol. 1 1.1	The Proponent
1.3	Overview of the Undertaking	Vol. 1 2.1	Overview of the Undertaking
1.4	Purpose of the EIS	Vol. 1 1.2	Purpose of the EIS
Section 2: The Proposed Undertaking			
2.1	Study Areas		
a	Current land and marine use in the area including the locations of the nearest temporary and permanent dwellings, commercial and industrial sites, scheduled and non-scheduled salmon rivers, commercial and recreational fishing areas and navigation routes.	Vol. 3 Grattan et al. 2018 Vol. 1 4.4	Land and Resource Use
b	The environmental significance and value of the geographical setting in which the project will take place, and the surrounding area.	Vol. 3 Grattan et al. 2018	
c	Environmentally sensitive areas, such as national, provincial, and regional parks and reserves; EBSAs; estuaries, rivers, and habitats of federally or provincially listed species at risk; and other sensitive areas.	Vol. 1 4.2.5 4.2.6 4.2.6.1 4.2.6.2	Species at Risk Sensitive Areas National, Provincial and Recreational Parks and Reserves Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA)
d	A description of local communities, including any sewage effluent and/or other water discharges that may adversely affect the project.	Vol. 1 4.2.2.7	Water Quality
e	A description of the hatchery site and landing site for transferring smolt to the well boat.	Vol. 1 2.4.3 2.4.3.2	Land-based Facility (RAS Hatchery) <u>Operations and Maintenance</u> <u>Fish Transfer to Well Boat</u>
f	A description of sea cage sites and navigation routes: from hatchery to sea cage sites; between sea cage sites; from marine docking stations to sea cage sites; and from sea cage sites to fish processing facility.	Vol. 1 2.4.4.2	<u>Operations and Maintenance</u> <u>Resupply</u>
g	Delineation of the four proposed BMAs and a description of the process that leads to the approval and designation of BMAs by the Department of Fisheries and Land Resources.	Vol. 1 2.4.2.2	Marine
2.2	Rationale for the Undertaking	Vol. 1 2.4.1 2.4.1.1	Project Rationale Rationale for Proposing European-strain Sterile Triploid Atlantic Salmon
2.3	Project Description	Vol. 1 2.4	Project Description
2.3.1	General Layout		
a	The land-based hatchery facility and associated buildings.	Vol. 1	

**Pages 536 to / à 546
are withheld pursuant to section
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68(a)

**of the Access to Information Act
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From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-28-18 3:39 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Squires, Susan; Loveless, Ashley
Subject: Public comments and Concerns Table up to 22June18
Attachments: INDIVIDUAL CONCERNS_22Jun18.pdf; EIS_public concern table_19Jun18.doc; ALL Support up to 22Jun18.pdf

Hi All,

I've attached consolidated emails in support of the Grieg aquaculture project, as well as those expressing concerns related to the project, that have been submitted to EA Division up to today. A public concerns table is also attached for your review and comment, relative to your mandate. The concerns table doesn't include the concerns brought forward in a letter submitted by the Atlantic Salmon Federation on July 22, 2018., as those have been provided to you in a separate email.

There have been 18 emails submitted to EA Division within the past few days requesting an extension to the public review period for the EIS, and the extension requested ranges from 2 weeks to 2 months. The request for an extension is currently under review by Environment senior staff. The legislation includes the following statutory provisions:

section 11 (3) of the Environmental Assessment Regulations, 2002, requires a person who wishes to make responses to or comments on an EIS, to submit those responses or comments to the minister, in writing, not more than 50 days after the minister's announcement that an EIS is required. The date that is 50 days after the minister's announcement requiring an EIS is July 11, 2018, which is the deadline for the submission of public comments regarding the EIS.

section 20 of the Environmental Assessment Regulations, 2002, provides for the minister and a proponent to agree, in writing, to the extension of a required time limitation.

The EA Director, Dr. Susan Squires, will keep you apprised of any decisions regarding an extension. If you have any questions please feel free to call Susan at 729-0673, or email SusanSquires@gov.nl.ca.

I will resume my duties as Chair of the EAC when [REDACTED] Please contact Susan if you have any questions or concerns.

Regards,

Joanne

s.19(1)

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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Sweeney, Joanne

From: [REDACTED]
Sent: Thursday, May 24, 2018 2:32 PM
To: EA Project Comments
Subject: Comment

The world is moving away from ocean moored salmon pen farming: You know that and you know the risks.

Inland farms are the safe alternative: You know that as well.

You probably also know that many jobs could be generated through the latter but the start up costs are higher.

It's time to do the right thing and help protect a resource that is in trouble. Are a few short term jobs on the south coast worth the long term risks?

You know the answer!

You should know this; I will vote against any government who supports open water salmon pens.

Here are two more reports!

[Saving Wild Salmon - PCC Community Markets](#)



Saving Wild Salmon - PCC Community Markets

The only good outcome of the massive escape of Atlantic salmon from net pens near Cypress Island is that residen

https://www.foodandwaterwatch.org/sites/default/files/disasters_ocean_aquaculture_fs_feb_2011.pdf

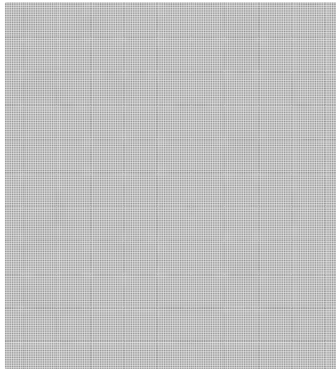
s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Thursday, May 24, 2018 8:26 AM
To: EA Project Comments

The proposed salmon farms that are to be installed in Placentia Bay are going to cause a lot of trouble for our bay. The tides and storm surges we get in this bay are of astronomical proportion. These "open pens" will never hold up to the weather we receive here. The escapee loss of Farmed salmon that mix with the wild salmon will most definitely be nothing short of catastrophic. Any diseases these farmed salmon have will be passed on to our wild salmon and be passed around like a bad flu. The antibiotics and chemicals that are going to be dumped into our bay to fend off sea lice and infections will definitely do a number on our fish stocks and other species such as halibut, lobsters & pelagic species. The dead zones around these pens will also cause a lot of harm to the environment. Also having these pens right where fishermen catch they're fish and make a living to feed they're families will be devastating. People can't survive on nothing and this project, although creating a few jobs, will do more harm than good in Placentia Bay!!!

s.19(1)



June 26, 2018

Joanne Sweeny, project Chair

Dept of Municipal Affairs Environment

Environment Assessment Division

West Block, Confederation Building

P O Box 8700

St John's NL ,A1B 4J6

Placentia Bay Grieg Seafood project #1834

Hi Joanne and all the other members of the assessment team
.First of all i would like to start with a little over view of my
feeling of this process of this EIS as i started to read this report i
was confuses of the lack of info that Grieg had provide to the

cause .I have not read the EIS guideline of what was required for Grieg to do for this report .As i continued to read the report that they sent to the assessment division for a review i figure that the propend should have done some studies to see what the on pact would be ,like how many trout ,salmon ,sea bird ,and so on so if you do not have a base line to go by how can we fllow what is happening to the environment and the effect on them .

Here i will try and put forward some of my concerns

2.3.3 page 11

Norwegian Standards

They said they have voluntary decided to adhere (where appropriate) to Norwegian Standards. They should be made follow those standards because the Newfoundland standards are little to none existing.

2.4 page 11 Project Description first paragraph

It is said that the salmon will be process in a third party fish plant so this will not be part of this assessment. I will recommend that yes this will be part of it .If we look at what happen in British Columbia with the Blood pipe as it was called in the possessing plant that was processing farmed salmon and spreading the decease .

2.4 triploid

The proponent try to explain this at the meeting here in Marystown that they were 100% triploid and any research that i have read the best that i could find would be 98% so if you have only 2% that are not this means a lot of diploids .And in the EIS that Grieg has proposed it does not give any scientific evidence to satisfied myself .We know they were saying the same for the salmon farms in Fortune bay and over in connaigre bay but as we all know now that Dr Bradbury of fisheries and ocean has proveing that he done a study on 19 streams here on the south coast and 18 of those site have proven that we have a problem with the farm salmon are breathing with the wild salmon .SO this is the reason that they should not be a loud to import a foreign species to our waters .

2.4.2.2 Marine Page 14

As for this article were they have there BMA all of the open net pens are to close to all the salmon and trout stream that we have in that are they say that they are out pass the recommended distance ,but i am recommending that there should never be in any distance for any salmoind were they migrate .Greig has not even done any study to see if there are even any salmon or trout and if there are any salmoind in the area they did not do a study to find out the migrating route and

they don't even know if and when to they enter or leave the bay .The only this that i read in the EIS they said about the angling static so if this is what they are basing their study on i know they must be joking .well now how are they going to know if and when they get the go ahead with this farm if in two years time we have a escape which no doubt there will be one they do not have a baseline to compare it so back to the drawing board .

Mortalities Page 36

So if the Burin Pen waste management are going to take this dead fish in our land fill will those fish be deceases free from the know virus like the PRV just to name one .As we all know that when this fish is entering our land fill the local animals will be feeding on this such as bears coyotes sea gull just to name a few.

Decommissioning page 42

2.4.3.3

Grieg should be made to put up front an amount of money to cover the cost of a clean up to get all the garbage out and disposed of ,same as the mining companies have to do ,not like ya see all around the coves and bay in Fortune Bay .

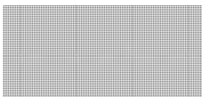
Sea Cages

They are saying that those cages form aquiline are 100% escape prove as the engineer told me when i spoke to him last year at the meeting here in Marystown ,he told me that they had a whale in one about tree weeks before he came here to Canada like i told him what can stop a 20 ton whale or a big shark coming down on it it is only made of twin ,as we as Newfoundlanders know form our problems we have had with the cod trap i the past and whales they don't have to tell us what happens. They had not explained what will they do when we have an escape and how they are going to catch them fish ,just look at the rest of the escapes that have happen around the world and in our own back yard Washington state.

7.2.1.2

The self reporting is a good indication that ther will be no reporting as we have seen .

Thanks for the chance to voice some of my concerns on thei drastic propose fish farmes i am concerned there should not be any more salmon farm in the ocean they Grieg should be made do what the world is doing and farm it all on land in close containment .



Sweeney, Joanne

From: [REDACTED]
Sent: Wednesday, May 23, 2018 1:52 PM
To: EA Project Comments
Cc: [REDACTED]
Subject: Placentia Bay Atlantic Salmon Aquaculture Project

Follow Up Flag: Follow up
Flag Status: Completed

Many years ago, the St. Lawrence mine opened with "dry drilling" for fluorspar, using techniques that were banned in other parts of the world because they were proven to cause harm (even death) to workers. The government of Newfoundland welcomed the "dry drilling" because it would create much needed employment. In hind-sight this was a terrible decision.

The fish farming techniques proposed by Grieg are banned in other parts of the world because they are proven to cause harm to the environment. (There has NEVER been a "cage" salmon farm that has not had an adverse effect on adjacent river salmon populations.)

It is possible, although unlikely, that those making decisions on allowing "dry drilling" were ignorant to the facts.

It will be impossible for you to claim ignorance.

Do the right thing.



s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Wednesday, May 23, 2018 7:59 AM
To: EA Project Comments
Subject: EIS

Follow Up Flag: Follow up
Flag Status: Flagged

Hello

Just went threw the EIS briefly and did not see anything for a plan to deal with pack ice. Is GREIG and the government still turning a blind eye to the major risk and saying pack ice will not effect there pens ? It is well documented that the pack ice is a major risk in all bays around the island every spring.

Also wondering about the job, I attended the information session in St. John's and they would not say how many jobs will be created, they also said they would be bringing in "specialist" from Norway, which only means they want the locals for the low wage positions, and really how many jobs are going to be available once it is up and running ? Is it worth the devastation that it will cause to our waters ?

All the science and facts are proven that GREIG and all other open pen aquaculture is a disaster to the marine life around it, and anything that comes near it, the salmon from these pens are proven to be one of the most toxic foods you can eat ! Why would Newfoundland government want anything to do with this, the jobs that will be created already exist in other fields like the offshore, take the money, save our oceans and train people up for those jobs instead.

If this project goes ahead I think there should be a legal requirement that the people who approved this project and the people involved with it should be held legally accountable for there actions, especially since there is so much solid evidence on what a actual disaster GREIG and this whole industry are. GREIG could not even be prepared for a simple information session, they could not answer 1 question that was asked of them ! They openly admitted if they can not use NL waters for free, NL is not the place for them, so I say let them go somewhere else.

Please consider the future, not just a few low paying jobs.

[REDACTED]

[REDACTED]

s.19(1)

Comments on Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project - specifically related to Ice

The following comments are offered on the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project prepared for Grieg NL and dated May 2018 (EIS), but the comments are limited to sections of the EIS describing the ice environment and ice effects and the Appendix III Aqualine Midgard Sea Cage Study. I have relied on the information presented in the EIS with reference to source data and other information to confirm some information.

My understanding is that the purpose of the EIS is to identify potential impacts of the proposed development on the environment and that the main impact that might arise from ice effects is the escape of fish arising from ice-induced damage to the containment system. The EIS does identify the likelihood and type of sea ice occurrence for the proposed cage sites but it does not explicitly link ice effects to possible cage failures. Nor does the EIS present plans to deal with or mitigate the effects of ice occurrence.

Placentia Bay is generally viewed as a relatively ice-free bay but historical data indicates that ice does occur in the bay and in the regions proposed for the fish farm cages. The assessment of ice data in the EIS is based on accepted Canadian Ice Service data. Placentia Bay presents challenges in interpretation because it is on the fringe of the sea ice extent and historical data is scattered. The annual probability of occurrence is something below 0.15 (or 15%). The EIS acknowledges the potential for ice but appears to rely on the relatively low probability of occurrence as the mitigating factor. The low probability of occurrence could be better interpreted in terms of return period. Although the probability of occurrence in any given year is below 0.15, over a period of many years, significant ice can be expected every eight to ten years based on the probability. Assuming the proposed operation will continue for a period longer than ten years, there will be years in which sea ice does occur at the cage sites. Furthermore it seems likely that topside spray icing, snow or freezing precipitation will occur on more frequent intervals.

When sea ice does occur, historical data indicates that concentrations can be up to full coverage and thicknesses are reported to range from 0.3 to 1.0 m. It is unlikely that fast ice, even in a particularly cold season, would exceed 0.4 to 0.5 m in thickness. It is expected that ice would be a combination of sea ice formed in place and possibly ice that drifted from other regions. Glacial ice is also infrequently present with the probability of occurrence decreasing towards the head of the bay. These conditions would be sufficient to cause problems for any sea cage installation.

Although the EIS mentions sea ice, it does not mention snow or freezing spray. Both of these environmental effects are not part of the available environmental data set and would be hard to quantify but might be estimated through enquiries with local fishermen or the oil terminal operators.

There are a number of ways ice and snow might affect a fish farm installation:

- Accumulation of ice, snow or freezing spray on the above-water portions of the cage, leading to deformation of the above water structure or sinking of the flotation collar from the added weight.
- Formation of fast ice on the sea surface, leading to cage collars or mooring buoys becoming frozen in place. Subsequent movement of this fast ice may apply large forces to the cage collar and/or mooring system. Fast ice may also prevent access to cage installations by service vessels, divers or ROVs.
- Impact from drifting pieces sea ice or glacial ice on the cage or mooring system.

Ice occurrence has a high potential for damage to cage and mooring structures. It is unrealistic that the proposed cage system (or any type of surface floating cage) could be engineered to withstand any significant ice load scenario. Thus ice has to be dealt with operationally by preventing ice loads from occurring. There are actions that can be taken to deal with ice. Examples would be:

- Relocating the system from an area where ice might form during the ice season.
- Submerging cages during periods of ice movement.
- Manually or mechanically removing accumulated spray ice, snow or freezing rain from above-water structures.
- Installing ice booms to prevent movement of frozen-in-place (fast) ice.
- Maintaining open water areas with bubblers.
- Deflecting or moving drift ice or bergs using service vessels or booms.

Not all of these approaches would be practical for the proposed cage systems but no ice mitigation measures are referenced in the EIS except; the Aqualine Midgard operating manual (Appendix III Aqualine Midgard Sea Cage Study) mentions that procedures for removing topside ice accumulations are required (Section 10.4), and the NL Code of Containment (Appendix V Aqualine Midgard Sea Cage Study) mentions Ice Booms.

The consequences of ice incursion are not explicitly dealt with in the EIS except in the general case of a cage failure leading to fish escapes. No strategies are presented to deal specifically with ice presence or incursion to prevent such a failure. There is mention of the cage technology as being particularly resistant to escapes but this cannot be extended to include the effects of significant sea ice.

The Aqualine Midgard Cage system is undoubtedly a well-engineered system and represents the current state of the art in aquaculture containment systems. The Aqualine Midgard Sea Cage Study is completely non-critical. No reference to ice mitigation is contained in the study.

In Section 2.3.3 of the EIS, it states that the proponent will follow the Norwegian Standard NS9415 and the Standard is provided in the Aqualine Midgard Sea Cage Study (Appendix II). The NS9415 Standard mentions ice in a number of sections including 5.5 *Determination of the Effects of Ice*, 6.5.5 *Environmental Loads*, 6.6 *Load Factors* and 7.14.2.7 *Requirements Regarding Operation of Main Components*. There is no specific reference to any of these sections in the Aqualine Midgard Sea Cage

Study or in the EIS, except general statements that the standard has been followed in the design of the system, or will be followed in the operation of the installations. It is not clear if the ice sections of the standard will be followed or if the relatively low probability of ice is interpreted to mean that ice is not a concern.

The operation of the Aqualine Midgard Sea Cage in other regions, such as Iceland, the Faroe Islands and the North Sea, is presented as comparable (or more severe) operating experience to Placentia Bay, but none of these locations have sea ice as a significant environmental factor. The thing that distinguishes Placentia Bay from previous operating experience for the proposed cage system is the presence, albeit infrequent, of sea ice.

The EIS has established the occurrence and characteristics of the sea ice that is likely to occur at the Placentia Bay sites at some times over the operational life of the proposed system. It would be beneficial to consider how these relatively infrequent, but highly consequential, ice events would be dealt with.



June 21 2018

s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Thursday, May 24, 2018 12:44 PM
To: EAProjectComments@gov.nl.ca.
Subject: aquaculture

Save our wild fish and stop using toxins to control sea lice.
This is the most toxic food in the world and very destructive to our wild fish.
Use land based aquaculture. Its environmentally freindly.
Why is NL 50 years behind other places do aquaculture?
This sea based salmon farming should not even be considered in our pristine waters.
Every where else is trying to remove these salmon farms and we are trying to get it started here, WHY?

[REDACTED]

s.19(1)

Page 562
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Sweeney, Joanne

From: Squires, Susan
Sent: Thursday, May 24, 2018 9:55 AM
To: Sweeney, Joanne
Subject: FW: Province seeking input on controversial Burin salmon farm proposal

Another letter re Grieg that should be sent a response encouraging them to consider the EIS document and provide comment. Once we have a draft response for the email I sent earlier we can consider if the same can be sent to this email.

Thanks,
Susan

Susan Squires, Ph.D.
Director (A)
Environmental Assessment Division
Department of Municipal Affairs and Environment Government of Newfoundland and Labrador
709-729-0673
susansquires@gov.nl.ca

-----Original Message-----

From: Glynn, Valerie
Sent: Wednesday, May 23, 2018 11:12 AM
To: Squires, Susan <SusanSquires@gov.nl.ca>
Subject: FW: Province seeking input on controversial Burin salmon farm proposal

Fyi....

-----Original Message-----

From: Info, MAE
Sent: Wednesday, May 23, 2018 11:08 AM
To: Glynn, Valerie <VGlynn@gov.nl.ca>
Subject: FW: Province seeking input on controversial Burin salmon farm proposal

Not sure where this needs to go.

Ali Askary
Manager, Information Services
Department of Municipal Affairs and Environment Government of Newfoundland and Labrador
709.729.5846 | aliaskary@gov.nl.ca

-----Original Message-----

From: [REDACTED]
Sent: Wednesday, May 23, 2018 9:29 AM
To: Info, MAE <MAEInfo@gov.nl.ca>
Subject: Province seeking input on controversial Burin salmon farm proposal

Just so you know...

Many, many people have given up eating fish due to the farmed crap. Farmed fish isn't nearly as healthy nor as tasty. Sorry, but these days unless I catch it or buy right off the boat, I'll not eat fish. There's been too much fraud and too many middlemen that do not support the environment or fisheries.

Fish farms are nothing more than man trying to manipulate Mother Nature and you know when she gets angry...

Support fish farms, kiss the natural world goodbye and we'll all be worse off.
How do you explain that to your kids?

s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Thursday, May 24, 2018 8:11 AM
To: EA Project Comments
Subject: Placentia Bay aquaculture project

Good day

[REDACTED]

I have read the proposed locations and plans for the sites in Placentia Bay.

Firstly I do not think in my professional opinion that they have taken into account the weather conditions/ sea conditions that can be experienced in these locations. I have seen first hand how bad the sea conditions are in these locations in the fall/winter months . At first glance these locations look well sheltered but the fact is they are not. Local effects exist here with certain winds/sea conditions , and I am most certain now matter what type of cage that is put there will not last. I have spent many nights and days there during the winter months trying to keep a boat either at anchor or alongside the dock there much less to say outside the headlands . The location of Darby harbour is very exposed to E and NE wind in which swell had reach 3 to 4 meter in the harbour .

The second point I want to make here that has not been included in the environmental effects is the Sea Run Brook trout fishery in Placentia Bay and how this will be effected . Some of the best sea run brook trout in Newfoundland happen in the rivers on Merasheen island and the rivers on west side of Placentia Bay . These farms are going to be located very near the mouths of these rivers . Can diseases from these fish be spread to this native species?

To conclude this I have travelled and worked extensively and talk on a regular basis to people in the marine industry from Norway. Right now they are using 2 types of salmon farms in Norway the first is land based . The second is ship shape cages which are actual ships totally in closed with no type of cage and can be moved with no trouble taking the salmon with it. Why can't we choose this option ? Should we not be leaders in this industry vs followers and think ahead ? This project should not go ahead in this form in this location .

Regards

[REDACTED]

s.19(1)

From: EA Project Comments
Sent: Monday, June 11, 2018 8:07 AM
To: EA Project Comments
Subject: FW: Grieg BC Toxic Algae Disaster Update, dumping dead fish

Follow Up Flag: Follow up
Flag Status: Flagged

Hi All;

Just a little FYI. Nutrifying a coastline in Canada is illegal for every industry in Canada except - you guessed it- open net pen owners...

"there is little salmon farms can do to prevent one from killing their fish, Haigh said. Once a bloom is suspected, they can stop feeding the fish – as that contributes to the spread of the algae — "

From: <https://www.undercurrentnews.com/2018/06/08/british-columbia-salmon-farmers-on-alert-after-griegs-toxic-algae-disaster/>

What about the tonnes of feces and wasted feed around the cages - how does that help trigger toxic blooms??
...Sadly, we have government regulators as cheerleaders and investors.



From: [Redacted]
Sent: June 4, 2018 7:35 AM

Subject: Another land based RAS salmonid farm in Japan, feed issues, dumping dead fish

Hi All;

The headlines below from this past week speak volumes of the Grieg project and the 1958 open net pen model that allows profits at the expense of public resources.

<http://www.intrafish.com/aquaculture/1500612/taking-ras-to-the-next-level-mitsui-land-based-fish-farming-dreams>

Taking RAS to the next level: Mitsui's land based fish ...

Company is currently constructing a land-based rainbow trout facility, and has ambitious plans for the future.

www.intrafish.com

s.19(1)

|

By not embracing the trends and ongoing improved sustainability of salmonid aquaculture, we are being left behind.

eg <https://www.undercurrentnews.com/2018/06/04/agriproteins-105m-investment-is-largest-to-date-in-insect-protein-sector/>

AgriProtein's \$105m investment is largest to date in insect protein sector

You may also like: Influential non-profit group puts weight behind alternative feed push Rabobank: Novel aquaculture feeds will boost marketability of farmed seafood Insect feed firm Agriprotein wins BBC innovation award

|

www.undercurrentnews.com

Salmon and veggies go well together:

<https://www.undercurrentnews.com/2018/05/31/superior-fresh-poised-to-sell-first-us-land-raised-atlantic-salmon/>

Superior Fresh poised to sell first US land-raised Atlantic salmon

You may also like: Atlantic Sapphire surges on OTC days before stock moves to Oslo US RAS tilapia farm integrates to survive, but it's lonely Salmon giants think big on land-based smolt production Atlantic Sapphire aims to conquer 10% of [...]

|

www.undercurrentnews.com

How much has been illegally dumped in NL since 2012?

s.19(1)

<http://salmonbusiness.com/chilean-supreme-court-rules-dumping-of-dead-salmon-illegal/>

Chilean Supreme Court rules dumping of

dead salmon illegal ...

The Chilean Supreme Court has ordered the government to devise a new anti-pollution plan within two months after declaring the dumping of 9,000 tonnes of dead salmon by the Fisheries Directorate illegal.

salmonbusiness.com

From: [REDACTED]

Sent: May 7, 2018 12:52 PM

Subject: Pesticide Abuse Charges AGAIN for NL Open Net Pen Aquaculture Company

Premier, Ministers, MHAs, and Respected Others;

All three NL open net pen companies (including the bankrupt Gray's Aqua) have been charged (Cooke Twice) and convicted. This is Northern Harvest second offence in recent history. Why is government funding convicted ecocidal criminals with tax payers money? Pesticide over-sight and enforcement in NL is virtually non-existent with insider/former employee reports of abuse rampant. These are some of the DEADLIEST compounds known to humankind!

The neurotoxins these companies regularly dumping our NL Bays at a rate of 400-600 KILOS annually PER TOXIN - are deadly to our largest crustaceans at rates of 1/5th of a BILLIONTH of a GRAM per liter according to a recent DFO study (Burrige 2013). A more recent study shows that lobster shipping mortalities increase after a minuscule exposure and results in abnormal behaviour that leaves them vulnerable to predation (ie sick and stumbling around out in the open). No wonder Harper axed the DFO toxicology section and labs completely.

We are one youtube video away from losing our pristine seafood marketing image.... none of these toxins are used in closed containment RAS land based aquaculture. There are no sea lice, marine parasites, etc in well water....

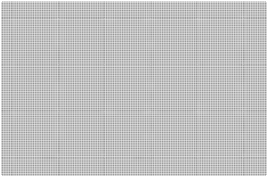
<http://www.cbc.ca/news/canada/new-brunswick/northern-harvest-sea-farms-aquaculture-charge-1.4648464>

New Brunswick aquaculture company faces pesticide charge | CBC News

Little information is being released about a charge to be laid this month against New Brunswick-based Northern Harvest Sea Farms.

www.cbc.ca

s.19(1)



s.19(1)

Sweeney, Joanne

From: [REDACTED]
Sent: Saturday, June 23, 2018 12:27 PM
To: [REDACTED] cbcnlinvestigates@cbc.ca; [REDACTED]
[REDACTED] marine@ecologyaction.ca;
[REDACTED]
[REDACTED] hereandnow.nl@cbc.ca;
[REDACTED]
[REDACTED] Ball, Dwight; Bennett, Cathy (MHA); Bennett, Derek; Bragg, Derrick; Brazil, David J.; Browne, Mark; Byrne, Gerry; Coady, Siobhan; Crocker, Steve; Davis, Bernard; Davis, Paul A (MHA- District of Topsail); Dean, Jerry; Dempster, Lisa; Edmunds, Randy; Finn, John; GambinWalsh, Sherry; Haggie, John; Haley, Carol Anne; Hawkins, Allan; Holloway, Colin; Hutchings, Keith; Joyce, Eddie; King, Neil; Kirby, Dale; Lane, Paul; Letto, Graham; Michael, Lorraine; Mitchelmore, Christopher; Osborne, Tom; Parsley, Betty; Parsons, Andrew; Parsons, Kevin; Parsons, Pam; Petten, Barry; Perry, Tracey; Reid, Scott; Rogers, Gerry; Trimper, Perry; Warr, Brian;
[REDACTED]
[REDACTED] news@ntv.ca;
Subject: More dead fish, Open Net Pen media highlights
Follow Up Flag: Follow up
Flag Status: Flagged

Hi All;

Rumour has it that an open net pen aquaculture site near Hbr Breton (?Cooke?) has a LOT of dead diseased fish on its hands **again this week**. Details will be emailed to you all soon. Workers are being told not to eat more than 1 fish a week if they are taking fish from these pens near Harbour Breton (antibiotics/neurotoxins galore is my guess as to why).

In the meantime, feast your eyes on a few of the recent headlines:

Why would buy expensive Norwegian leases and fact more stringent regulations they when they can get a license for TWICE as much fish for \$2600 CAD in NL vs \$14 MILLION CAD in Norway for HALF the amount of fish??

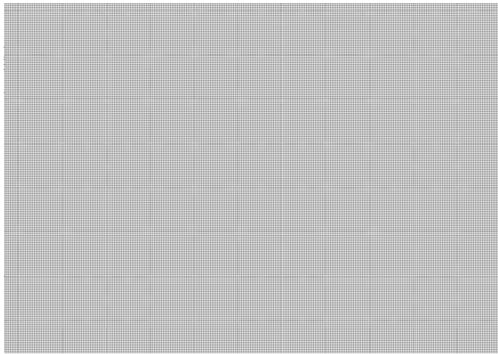
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Therefore, Grieg Seafood did not buy growth in the first auction round

News

20 June 2018

From: <https://ilaks.no/difor-kjopte-ikkje-grieg-seafood-vekst-i-forste-auksjonsrunde/>




Difor kjøpte ikkje Grieg Seafood vekst i første auksjonsrunde

Onsdag vart det klart at 13 selskap har kjøpt vekst for 2,3 milliardar kroner. Grieg Seafood og Lerøy Seafood var ikkje blant aktørane. – Ein skal ikkje sjå bort frå at ein ser meir aktivitet frå Grieg Seafood neste gang vekst vert lyst ut, seier administrerende direktør

Meanwhile, the Finance and Deputy Director of Grieg's Placentia Bay Partner - Aqualine - bails to share the helm of a LAND BASED RAS COMPANY!!

Leaving Aqualine and becoming director of Nofitech

"Our analyzes show that the market for post-smolt plant and fish farms based on RAS will grow significantly in the coming years. Nofitech has now proven modular solutions that both have lower investment costs and are more cost-effective in operation, so this is a good starting point for good growth in Nofitech, says 

<https://ilaks.no/forlater-aqualine-og-blir-direktor-i-nofitech/>

s.19(1)

Konferanse: Aqualine og Nofitech Nofitech

[redacted] i Nofitech Holding og Norwegian Fishfarming Technologies. Hundstad kommer fra stillingen som finans- og viseadministrerende direktør i Aqualine og var før det drifts- og administrasjonsjef i IKEA frem til 2011.

ilaks.no

Be afraid for the future of our marine and freshwater ecosystems....very afraid.

"

Back in January, analysts and industry sources told *Undercurrent* that they felt the CAD 315 million (\$248m) deal would allow the company to compete globally, however. That's if the powers that be assess the salmon sector on a national, not coastal basis. At the time, Marine Harvest did not respond to a request for comment from *Undercurrent*.

The company does not currently farm at all on the east coast of Canada, but has been acquisitive in order to build a sizable operation in the Maritimes.

"

<https://www.undercurrentnews.com/2018/06/22/canada-competition-regulators-ok-marine-harvests-deal-for-northern-harvest/>



Canadian competition regulators OK Marine Harvest's deal for Northern Harvest

You may also like: Newfoundland salmon farmer: ISA contained on eve of sale to Marine Harvest
ISA detected at Canadian farmer
Marine Harvest is buying Cooke harvests salmon farm after Newfoundland ISA
find Marine Harvest likely to fall foul of [...]

www.undercurrentnews.com

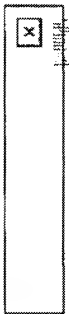
Land Based Sustainable operations and feed are coming. Keep the faith. ☺

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Will build a fly factory for NOK 300 million: - We have signals from big heavy players who want to enter the project

██████████ will build a factory at Valsneset in Bjugn in Trøndelag, which will produce fish feed from insects.

<https://ilaks.no/vil-bygge-fluefabrikk-til-300-millioner-kroner-vi-har-signaler-fra-store-tunge-aktorer-som-onsker-a-ga-inn-i-prosjektet/>



Vil bygge fluefabrikk til 300 millioner kroner: – Vi har signaler fra store tunge aktører som ønsker å gå inn i prosjektet

██████████ vil bygge en fabrikk på Valsneset i Bjugn i Trøndelag, som skal produsere fiskefôr av insekter. - Vi jobber fortsatt med å hente inn kapital til fabrikken, men vi har signaler fra store tunge aktører som ønsker å gå inn i prosjektet, sier Botngår

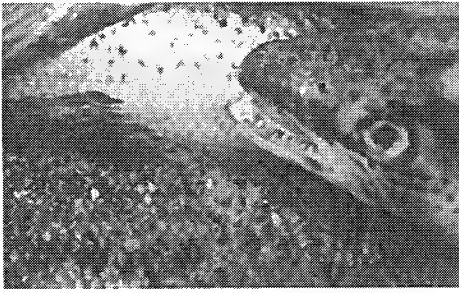
Publisert

Meanwhile....

"This year has seen an explosion in announcements of major RAS grow-out facilities in the United States. [NORTH OCEAN](#) and [FRESH FARM](#) have announced projects in Maine that will cost hundreds of millions of dollars to build. [AQUACULTURE](#), also building a massive land-based farm near Miami, has worked closely with the Freshwater Institute in the developmental phases of its project.... Triploid eggs are created in a pressure chamber and reduce the impacts that escaped farmed salmon could have on wild populations. Traditionally, fish from triploid eggs have shown weaker growth performance at post-smolt level."

<https://www.undercurrentnews.com/2018/06/22/freshwater-institute-ushers-in-new-era-of-ras-farming/>

s.19(1)



Freshwater Institute ushers in new era of RAS farming

You may also like: Superior Fresh poised to sell first US land-raised Atlantic salmon Former brewer, shipbuilder joins RAS salmon farmer Whole Oceans as COO Land-based sea trout farm planned for South Africa Atlantic Sapphire surges on OTC days before [...]

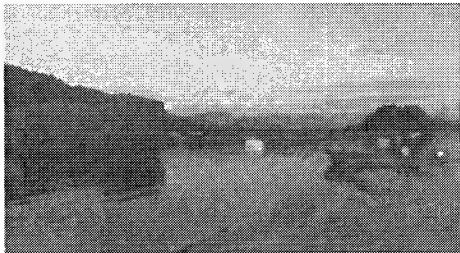
www.undercurrentnews.com

ASF's review of the EIS is scathing and suggestive of a disregard by Grieg for the EIS process:

http://0104.nccdn.net/1_5/044/088/1f6/ASF-comments-on-Placentia-Bay-aquaculture-EIS--reg.-1834-.pdf

The "we certify ourselves" attitude is failing...

[https://www.undercurrentnews.com/2018/06/20/seachoice-asc-partner-warns-sea-lice-exceptions-risk-program-integrity/?utm_source=Watershed+Watch+Email+List&utm_campaign=102fd95018-SALMON NEWS 2018 03 28 COPY 01&utm_medium=email&utm_term=0_405944b1b5-102fd95018-166913557&mc_cid=102fd95018&mc_eid=f5aae65eee](https://www.undercurrentnews.com/2018/06/20/seachoice-asc-partner-warns-sea-lice-exceptions-risk-program-integrity/?utm_source=Watershed+Watch+Email+List&utm_campaign=102fd95018-SALMON%20NEWS%2018%2003%2028%20COPY%2001&utm_medium=email&utm_term=0_405944b1b5-102fd95018-166913557&mc_cid=102fd95018&mc_eid=f5aae65eee)



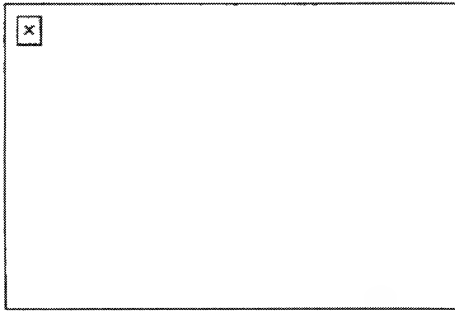
SeaChoice: ASC partner warns sea lice exceptions risk program integrity

You may also like: SeaChoice asks ASC to remove sea lice exceptions for Canadian salmon farms Cermaq to temporarily stop using ASC label after elevated sea lice levels in Canada MSC blasts SeaChoice over 'misleading' Canadian fisheries report MSC, ASC [...]

www.undercurrentnews.com

Government documents provided to the Star this week show Fisheries and Oceans Canada was aware proposed salmon farms could have serious consequences for wild fisheries, including a prime shrimp trawling area, before issuing licenses for the B.C.

projects. <https://www.thestar.com/vancouver/2018/06/13/feds-approved-fish-farms-despite-known-concerns-documents-reveal.html>



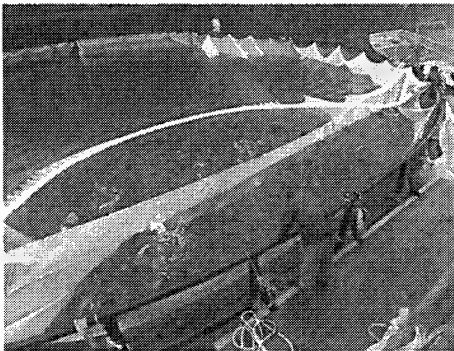
Feds approved fish farms despite known concerns: documents ...

Documents outline concerns that proposed salmon farms could affect a long-term sea cucumber research site and reduce the shrimp trawling area used by local fishermen.

www.thestar.com

Liberal MP says the time has come to transition to closed containment salmon aquaculture in British Columbia.

<http://vancouver.sun.com/opinion/op-ed/pamela-goldsmith-jones-transition-salmon-aquaculture-to-closed-containment>



Pamela Goldsmith Jones: Transition salmon aquaculture to closed containment

The time has come to transition to closed containment salmon aquaculture in British Columbia. It is time to transition British Columbia's open net salmon aquaculture industry to closed contain...

vancouver.sun.com

BC ramps up movement to transition from open net pens.

<https://globalnews.ca/news/4281707/b-c-s-wildlife-tourism-industry-pushes-for-fish-farm-licences-not-to-be-renewed/>



B.C.'s wildlife tourism industry pushes for fish farm licences not to be renewed

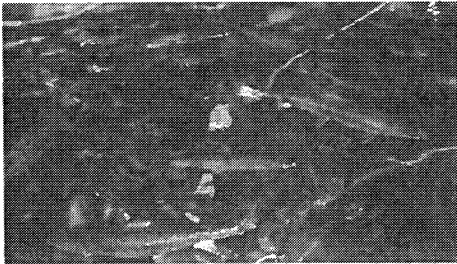
With the deadline approaching for the B.C. government to renew 20 fish farm licences, a group of

marine tourism operators are imploring the government to let the ...

globalnews.ca

sounds off against industry propaganda:

<http://thechronicleherald.ca/letters/1577698-counterpoint-muddying-the-aquaculture-waters>



COUNTERPOINT: Muddying the aquaculture waters | The ...

I agree with [REDACTED] (June 8 letter) that [REDACTED] June 1 Business commentary is trying to bolster general public and subsequently government, support of the aquaculture industry, by using misleading statements.

thechronicleherald.

Almost ALL the applications for the recently announced "green licenses" in Norway - even thee most innovative solutions - are being rejected in Norway...the notable exceptions are land based closed containment projects - these are being approved and given FREE licenses.
eg.

Albatros Technology received no development permits: - Where is the limit for what is innovative?

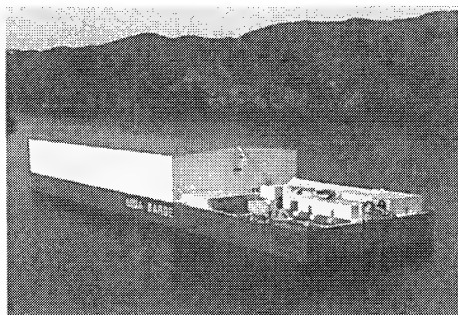
News

21 June 2018

Dutch Albatros Technology was the first foreign-registered company to apply for development permits, but received no from the Directorate of Fisheries for the concept "AquaBarge". Now an appeal is being considered.

s.19(1)

<https://ilaks.no/albatros-technology-fikk-nei-til-utviklingstillatelser-hvor-gar-grensen-for-hva-som-er-innovativt/>

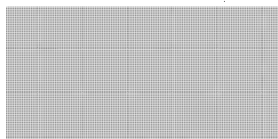


Albatros Technology fikk nei til utviklingstillatelser: – Hvor går grensen for hva som er innovativt?

Nederlandske Albatros Technology var det første utenlandskregistrerte selskapet som søkte om utviklingstillatelser, men fikk nei fra Fiskeridirektoratet til konseptet AquaBarge. Nå vurderes en anke. – Vi skal sette oss ned og gå nøye gjennom avslaget, og se om det er grunn

ilaks.no

Explain how we are not "laggards" Minister Byrne, please.



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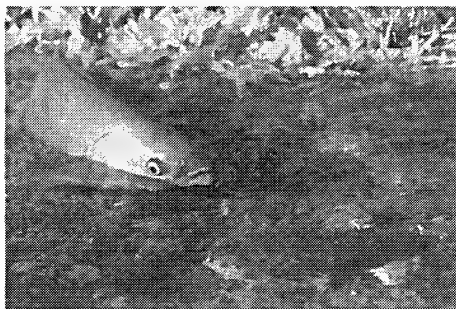
Sweeney, Joanne

From: [REDACTED]
Sent: Saturday, June 23, 2018 12:41 AM
To: [REDACTED] cbcnlinvestigates@cbc.ca; St. John's Fisheries Broadcast; [REDACTED]

Cc: Sweeney, Joanne; Adams, Blair
Subject: New Rules for BC Salmon Pharms Just Announced - and Grieg Reg #1834

Follow Up Flag:	Follow up
Flag Status:	Flagged

<https://news.gov.bc.ca/releases/2018AGRI0046-001248>




B.C. government announces new approach to salmon farm tenures

The Government of British Columbia will establish rigorous new rules and expectations for the renewal of salmon farm tenures in B.C. waters.

news.gov.bc.ca

s.19(1)

EIS INDIVIDUAL COMMENTS AND CONCERNS – up to June 14	SECTION	PAGE	EAC COMMENTS
1. Effects of Sea Ice and Weather on the Project			
<ul style="list-style-type: none"> • The EIS has no plan to deal with pack ice. Are the proponent and the government turning a blind eye to the potential effects of pack ice on the project?(2) • The proponent has not considered the weather / sea conditions that can be experienced at the proposed sea cage locations. • The tides and storm surges in this bay are of astronomical proportion. These “open pens” will never hold up to the weather. • The assessment of ice data in the EIS is based on accepted Canadian Ice Service data. Placentia Bay presents challenges in interpretation because it is on 	<p>Volume 1 Section 4.2.2 - 4.2.2.7</p> <p>Section 6</p> <p>Volume 3 CS 1A Section 4.5</p>	<p>Pg. 142- 152</p> <p>Pg. 350- 353</p> <p>Pg. 18- 26</p>	

<p>the fringe of the sea ice extent and historical data is scattered.</p> <ul style="list-style-type: none">• The EIS acknowledges the potential for ice, but appears to rely on the relatively low probability of occurrence as the mitigating factor. The low probability of occurrence could be better interpreted in terms of return period. Although the probability of occurrence in any given year is below 0.15, over a period of many years, significant ice can be expected every eight to ten years based on the probability.• There are a number of ways ice and snow might affect a fish farm			
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<p>installation:</p> <ul style="list-style-type: none"> - Accumulation of ice, snow or freezing spray on the above-water portions of the cage, leading to deformation of the above water structure or sinking of the flotation collar from the added weight. - Formation of fast ice on the sea surface, leading to cage collars or mooring buoys becoming frozen in place. Subsequent movement of this fast ice may apply large forces to the cage collar and/or mooring system. Fast Ice may also prevent access to cage installations by service vessels, divers or ROVs. - Impact from drifting pieces 			
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<ul style="list-style-type: none"> • sea ice or glacial ice on the cage or mooring system. 			
2. Employment			
<ul style="list-style-type: none"> • How many jobs will there be once the project is operational? • Only low paying jobs available to locals. • Are a few short term jobs on the south coast worth the long term risks of wiping out our wild Atlantic salmon stocks? (2) 	Volume 1 Section 4.7	Pg. 321- 343	
3. Open Net Pens Should be Banned in Favour of Land-Based Aquaculture or other Alternatives			
<ul style="list-style-type: none"> • Open net pens have adverse effects on surrounding marine life and have been banned in other parts of the world. Why aren't they banned here? 5 • Right now Norway is using two types of salmon farms: land- based and ship shape cages 	Volume 1 Section 2.7.3.4	Pg. 116- 118	

<p>which are totally enclosed ships. Why can't we choose this option?</p> <ul style="list-style-type: none"> • All salmon farming should be land-based to avoid the impacts of disease and parasites on wild fish and the marine environment.³ • I will vote against any government who supports open water salmon pens. 			
4. Effects of Salmon Farms on Wild Atlantic Salmon and Other Species in Nearby Rivers.			
<ul style="list-style-type: none"> • The environmental effects of the project on the Sea Run Brook trout fishery in Placentia Bay have not been considered. • Can diseases from these fish be spread to this native species? • There has never been a "cage" salmon farm that has not had an adverse effect on adjacent river salmon 	<p>Volume 1 Section 4.2</p> <p>Section 7.0-7.3</p> <p>Section 8</p> <p>Volume 3 CS 1A Section 4.1-4.4</p>	<p>Pg. 173-192</p> <p>Pg. 354-403</p> <p>Pg. 482-486</p> <p>Pg. 3-17</p>	

s.19(1)

<p>populations.</p> <ul style="list-style-type: none"> • Salmon farms have a devastating effect on wild Atlantic salmon stocks. 			
<p>5. Effects of Administering Therapeutants, Pesticides, and Disinfectants at Sea Cage Sites on Wild Atlantic Salmon and Other Fish Species.</p>			
<ul style="list-style-type: none"> • The antibiotics and chemicals that are going to be dumped into our bay to fend off sea lice and infections will harm our wild Atlantic salmon stocks and other species such as halibut, lobsters & pelagic species. • Stop using toxins to control sea lice and save our wild salmon. 	<p>Volume 1 Section 8</p> <p>Volume 3 CS 1A Section 4.8.3 – 4.8.5</p>	<p>Pg. 482-486</p> <p>Pg. 47-53</p>	
<p>6. Effects of Administering Therapeutants, Pesticides, and Disinfectants at Sea Cage Sites on Farmed Salmon and Cleaner Fish</p>			
<ul style="list-style-type: none"> • Mechanical De-licing Results in Increased Injury and Death in 			

Treated Farmed Fish.			
7. Effects of Sea Cage Deposits (excess feed and feces) on the Ocean Bed Beneath the Sea Cages			
<ul style="list-style-type: none"> The dead zones beneath these pens will cause a lot of harm to the environment. The tonnes of feces and wasted feed around sea-cages will trigger toxic algae blooms. 	<p>Volume 1 Section 7.1 Section 7.1.2.3</p> <p>Volume 3 CS 1A Section 4.8.6</p>	<p>Pg. 356</p> <p>Pg. 363-365</p> <p>Pg. 53-55</p>	
8. Human Health Risks Associated with Eating Farmed Salmon			
<ul style="list-style-type: none"> Salmon from open net pens are one of the most toxic foods you can eat. (2) Public health advises people not to consume a lot of farmed salmon. Eating farmed salmon isn't as healthy as eating wild salmon. 			
9. Effects of Farmed Salmon Escapees on Wild Atlantic Stocks			
<ul style="list-style-type: none"> The farmed salmon escapees will pass on diseases to the 	<p>Volume 1 Section 7.7.1 – 7.7.2</p> <p>Volume 3</p>	<p>Pg. 431-466</p>	

s.19(1)

wild salmon and result in catastrophic losses of the wild salmon stocks. <ul style="list-style-type: none"> They have not explained what they will do if an escape happens and how they are going to catch those fish. 	CS 1A Section 4.8.1	Pg. 38-46	
10. Effects of the Project on Recreational and Commercial Fisheries			
<ul style="list-style-type: none"> Locating these pens in areas where fishermen catch fish and make a living to feed their families will be devastating to the fishermen. 	Volume 1 Section 4.4.1 – 4.4.2 Volume 3 CS 3	Pg. 205-263	
11. Tax Dollars Should Not be Used to Support the Project			
<ul style="list-style-type: none"> I don't want my tax dollars to contribute to the possible destruction of our natural salmon stocks. 			
12. The Amount of Time for the Public Review Period is Insufficient.(1)			
13. Effects of Using			

Lump Fish (Cleaner Fish) as Natural De-licing Agents for Farmed Salmon			
<ul style="list-style-type: none">• Production and husbandry of lumpfish results in new health and welfare challenges. The majority of prescriptions for antibiotic treatment in farmed fish in Norway in 2015 were prescribed for treatment of cleaner fish.			
14. Insufficient information provided in the EIS			
<ul style="list-style-type: none">• No ice mitigation measures are referenced in the EIS except; the Aqualine Midgard operating manual (Appendix III Aqualine Midgard Sea Cage Study) mentions that procedures for removing topside ice accumulations are required (Section 10.4), and the NL Code of Containment (Appendix V Aqualine Midgard Sea Cage Study) mentions Ice			

s.19(1)

<p>Booms.</p> <ul style="list-style-type: none"> • The consequences of ice incursion are not explicitly dealt with in the EIS except in the general case of a cage failure leading to fish escapes. No strategies are presented to deal specifically with ice presence or incursion to prevent such a failure. • In Section 2.3.3 of the EIS, it states that the proponent will follow the Norwegian Standard NS9415 and the Standard is provided in the Aqualine Midgard Sea Cage Study (Appendix II). The NS9415 Standard mentions ice in a number of sections 			
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<p>including 5.5 <i>Determination of the Effects of Ice</i>, 6.5.5 <i>Environmental Loads</i>, 6.6 <i>Load Factors</i> and 7.14.2.7 <i>Requirements Regarding Operation of Main Components</i>. There is no specific reference to any of these sections in the Aqualine Midgard Sea Cage 3 Study or in the EIS.</p> <ul style="list-style-type: none"> • As I started to read this report I was confused by the lack of info that Grieg had provided. • The proponent should have done some studies to see what the impact would be, like how many trout, salmon, sea bird, etc. are present. If you do not have a baseline to go 			
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<p>by, how can we follow what is happening to the environment and the effect on them?</p> <ul style="list-style-type: none"> • Greig has not even done any study to see if there are any salmon, trout or salmonid in the area. They did not do a study to find out the migrating route and they don't even know if and when they enter or leave the bay. The only thing that I read in the EIS about this was the angling statistics. 			
<p>15. Third-Party Salmon Processing Plant Should be Included in Assessment</p>			
<ul style="list-style-type: none"> • It is said that the salmon will be processed in a third-party fish plant, so this will not be part of this 			

assessment. I recommend that it should be a part of it. If we look at what happened in BC, the “blood pipe” in the salmon processing plant was spreading the disease.			
16. Damage to Open Net Pens due to Marine Wildlife			
<ul style="list-style-type: none"> They are saying that those cages are 100% escape proof. However, as the engineer told me when I spoke to him last year at the meeting in Marystown, he said that they had a whale in one about three weeks before he came here to Canada. What can stop a 20 ton whale or a big shark coming down on it? It is only made of twine. 			
17. Decommissioning			

and Rehabilitation			
<ul style="list-style-type: none"> Grieg should be made to put up front an amount of money to cover the cost of a cleanup, to get all the garbage out and disposed of. 			
18. Effects of Salmon Waste on Terrestrial Wildlife			
<ul style="list-style-type: none"> If the Burin Peninsula waste management is going to take this dead fish to our landfill, will those fish be disease free? When this fish enters our landfill, the local animals such as bears, coyotes, sea gulls, etc., will be feeding on this. 			
19. Defects in proposed 100% sterile, triploid eggs			
<ul style="list-style-type: none"> The proponent says that they will have 100% triploid eggs. In the EIS that Grieg 			

<p>has proposed, it does not give any scientific evidence that satisfied me. The highest percentage in any research that I have read would be 98%. So, if you have 2% that are not triploids, this means a lot of diploids.</p> <ul style="list-style-type: none"> • We know they were saying the same for the salmon farms in Fortune bay and Connaigre bay, but Dr. Bradbury of fisheries and oceans has proven that out of 19 streams on the south coast, 18 of them has a problem with the farmed salmon breeding with the wild salmon. 			
EIS GROUP COMMENTS			

AND CONCERNS			
NL-CAR (comments and concerns noted above are not repeated in this section)			
NLOA (comments and concerns noted above are not repeated in this section)			
FFAW-UNIFOR (comments and concerns noted above are not repeated in this section)			
SCNL (comments and concerns noted above are not repeated in this section)			
SAEN (comments and concerns noted above are not			

repeated in this section)			
NL Wildlife Federation (comments and concerns noted above are not repeated in this section)			
Port au Port Bay Fishery Committee (comments and concerns noted above are not repeated in this section)			
Qalipu First Nation (comments and concerns noted above are not repeated in this section)			
Gerry Rogers, MHA St. John's Central (comments and concerns noted above are not repeated in this section)			

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pages 46 to / à 51**

**Pages 613 to / à 614
are duplicates of
sont des duplicatas des
pages 44 to / à 45**

White, Terrena

From: Grant, Carole
Sent: June-26-18 11:33 AM
To: Parrill, Erika
Subject: FW: EIS
Attachments: Prevalence_of_piscine_orthoreovirus_and_salmonid_a.pdf; Glover2016_Article_GeneticScreeningOfFarmedAtlant-2.pdf

References from Ian.

From: Bradbury, Ian R
Sent: June-26-18 10:59 AM
To: Grant, Carole
Cc: Dempson, Brian
Subject: EIS

I have inserted the requested references and attached both papers here as well.

Ian

**Pages 616 to / à 630
are duplicates of
sont des duplicatas des
pages 484 to / à 498**

Roach, Jody

From: Rolls, Elaine
Sent: Tuesday, June 26, 2018 11:59 AM
To: Roach, Jody; Abbott, Melissa H
Cc: Temple, Glenn; Walsh, Jerry
Subject: RE: Grieg Aquaculture

Most definitely not. This would be an RCMP matter.

From: Roach, Jody
Sent: Tuesday, June 26, 2018 11:52 AM
To: Rolls, Elaine; Abbott, Melissa H
Cc: Temple, Glenn; Walsh, Jerry
Subject: RE: Grieg Aquaculture

It talks about site security breaches such as vandalism or persons refusing to leave the site. That doesn't seem like something a FO would be tasked to do?

From: Rolls, Elaine
Sent: Tuesday, June 26, 2018 11:21 AM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>; Roach, Jody <Jody.Roach@dfo-mpo.gc.ca>
Cc: Temple, Glenn <Glenn.Temple@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

What type of security breach?? Was there more info on the context here?

Elaine

Elaine Rolls
C&P Supervisor
Fishery Officer / Agent des Pêches
Conservation and Protection / Conservation et Protection
Box 1208, 7 Harris Drive Industrial Park / C.P. 1208 Harris Drive Industriel Parc
Marystown, NL A0E 2M0 / Marystown, Terre Neuve et Labrador A0E 2M0
Tel: (709) 279-7850 or () (cell) Fax / Copieur: (709) 279-7860
Email / Courriel: Elaine.Rolls@dfo-mpo.gc.ca

s.16(2)(c)

From: Abbott, Melissa H
Sent: Tuesday, June 26, 2018 10:57 AM
To: Rolls, Elaine; Roach, Jody
Cc: Temple, Glenn; Walsh, Jerry
Subject: RE: Grieg Aquaculture

I did notice that on Page 175 (page counter in pdf not document page number) – main text that “serious security breaches will be handled by Fisheries Officers” – this sounds a little odd – perhaps it is just me.

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Rolls, Elaine

Sent: Thursday, June 21, 2018 3:57 PM

To: Roach, Jody <Jody.Roach@dfo-mpo.gc.ca>; Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>

Cc: Temple, Glenn <Glenn.Temple@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>

Subject: RE: Grieg Aquaculture

I don't have much to add to Jody's comments but I did notice in Table 8.1 of section 8.0 Environmental Protection page 484 that is stated as a key mitigate measure for **Alter genetic integrity or biological fitness of wild salmon (sea cage operation- accidental salmon escape)** is "**DFO proposed sea cage distance of ≥20km from salmon river mouths (only sea cages in Rushoon BMA are <20km from scheduled salmon rivers)**". I'm not sure the reasoning for this but it did catch my attention as although Rushoon river is not currently scheduled it has a known run of salmon and it has been requested to be scheduled as well, the Bay de l'Eau river is close and that is a scheduled salmon river.

I as well did not see much reference to the AARs however, I did notice in several locations that they will not be storing therapeutants and pesticides at the sea cage sites or the hatchery. It didn't say that they won't be using them. Lumpfish is to be used to control sea lice but is it possible for any pesticide to be used? Possibly covered in another section of the EIS however, not identified as a section to be reviewed by C&P.

Elaine

Elaine Rolls

C&P Supervisor

Fishery Officer / Agent des Pêches

Conservation and Protection / Conservation et Protection

Box 1208, 7 Harris Drive Industrial Park / C.P. 1208 Harris Drive Industriel Parc

Marystown, NL AOE 2M0 / Marystown, Terre Neuve et Labrador AOE 2M0

Tel: (709) 279-7850 or [REDACTED] (cell) Fax / Copieur: (709) 279-7860

Email / Courriel: Elaine.Rolls@dfo-mpo.gc.ca

s.16(2)(c)

From: Roach, Jody

Sent: Wednesday, June 20, 2018 4:30 PM

To: Abbott, Melissa H

Cc: Rolls, Elaine; Temple, Glenn; Walsh, Jerry

Subject: RE: Grieg Aquaculture

Hi Melissa:

With a brief overview of the EIS, nothing is glaring to me from a C&P perspective in the sections identified for FM review. I don't see a whole lot of reference to the Aquaculture Activities Regulations but in conversations with Chris Hendry, I assume that will be more evident when the site licencing process rolls out.

Under **section 2.8.5 (Lost/Estranged Gear)**, it talks about gear breaking free and becoming a navigational hazard and a source of entanglement with other fishing gear. I would suggest another source of entanglement is with Marine Mammals and Sea Turtles; especially given that there have been past sightings of NARW in Placentia Bay. This can be

linked to section 3.3 (Valued Environmental Components) and perhaps consideration of entanglements is already covered here. However, Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.

Section 7.3.3 (Marine Mammals) and 7.3.4 (Sea Turtles) does discuss entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. The same can be said for table 7.12 and 7.13.

Table 7.23 is an appropriate place to capture the lost/estranged gear as a potential interaction with marine mammals and sea turtles and table 7.24 would capture the applicable mitigations.

Thanks,
Jody

Jody Roach

Senior Compliance Officer
Fisheries and Oceans Canada
Conservation and Protection
Email : jody.roach@dfo-mpo.gc.ca
Tel: 709-772-4345

From: Roach, Jody
Sent: Monday, June 4, 2018 10:27 AM
To: Rolls, Elaine <Elaine.Rolls@dfo-mpo.gc.ca>; Temple, Glenn (Glenn.Temple@dfo-mpo.gc.ca) <Glenn.Temple@dfo-mpo.gc.ca>
Cc: Ward, Chad <Chad.Ward@dfo-mpo.gc.ca>; Walsh, Jerry <Jerry.Walsh@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Good Day Elaine/Glenn:

Please find attached a link a to the Environmental Impact Statement for the Grieg aquaculture project and the associated sections that require review by Fisheries Management. Please review and provide your comments back to me by COB **Monday, June 18th** for roll-up.

Thanks,
Jody

Jody Roach

Senior Compliance Officer
Fisheries and Oceans Canada
Conservation and Protection
Email : jody.roach@dfo-mpo.gc.ca
Tel: 709-683-6131

From: Walsh, Jerry
Sent: Thursday, May 31, 2018 1:35 PM
To: Roach, Jody <Jody.Roach@dfo-mpo.gc.ca>; Shea, Paul <Paul.Shea@dfo-mpo.gc.ca>; Warren, Janet <Janet.Warren@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

For your review and comments, will you take the lead on this one Jody...tx

From: Abbott, Melissa H
Sent: Thursday, May 31, 2018 11:17 AM
To: Simms, Jason; Coffin, David; Dunne, Erin; Ball, Dave; Penney, Kim; Hawkins, Laurie; Rolls, Elaine; Walsh, Jerry
Cc: Burton, Ron; Ward, Chad; Rumbolt, Annette; Cahill, Paul; Walsh, Ray; Tobin, Derek (Duke)
Subject: FW: Grieg Aquaculture

Hi Folks

FM has been asked to review the Grieg Aquaculture EIS and provide comments, please see attached request for specific instructions. There is a link in the attached and under Documents – Environmental Impact Statement - Main Text

Please provide feedback to me by cob June 21 for rollup.

If you have any questions, please let me know

Thanks,

Melissa

See the attached for Instructions.

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html ("EIS: Main Text")

Section #	Section Title	Specific Subsections	Page # from Table of Contents	Page # in actual Document
2.8	Accidents and Malfunctions	2.8.5.	123	191
4.4.	Land and Resource Use	4.4.1. 4.4.2.	205	273
7.8.	Follow-up Monitoring		475	543
8.0	Environmental Protection		482	550

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

Please see attached request for review. If anyone in you Branch would like to comment on sections other than those highlighted in the attached please feel free to do so.

If you have any questions now or in the future please feel free to forward them to me anytime.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O)  (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

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No further information has been removed or severed from this page

Abbott, Melissa H

From: Abbott, Melissa H
Sent: Tuesday, June 26, 2018 12:47 PM
To: Johnson, Roger
Cc: Pilgrim, Bret
Subject: RE: Grieg Aquaculture
Attachments: Request to FAM Greig EIS Review.docx

Hi Gentlemen

Please see attached comments from the review of Greig Aquaculture EIS by FM (RM and C&P).

Any questions, please contact myself or Robyn Morris.

Thank You

Melissa Abbott

A/Senior Resource Manager – Sustainable Fisheries Framework
Resource Management and Aboriginal Fisheries
Fisheries and Oceans Canada
St. John's, NL
Phone: (709) 772-2915
e-mail: Melissa.abbott@dfo-mpo.gc.ca

From: Johnson, Roger
Sent: Wednesday, May 30, 2018 1:40 PM
To: Abbott, Melissa H <Melissa.Abbott@dfo-mpo.gc.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

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Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

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Page 637
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page 32

Robyn Morris Comments

Section #	Section Title	Specific Subsections
2.8	Accidents and Malfunctions	2.8.5.

Lost/Estranged gear

- p.123: Although “much of the gear would likely remain in place”, a worst-case scenario may assume that *none* of the gear would remain.
- What estranged/entangled gear with respect to marine mammals. What regulations will be used

Section #	Section Title	Specific Subsections
2.8	Accidents and Malfunctions	2.8.5.
4.4.	Land and Resource Use	4.4.1. 4.4.2.

4.4.2.3 Domestic Fisheries in the Study Area

- p.208: The statement “currently there is a shift back to a groundfish-based fishery (Fig. 4.17).” This statement is not clear from figure referenced. It’s recommended to add other supporting literature.
- P.224: to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); to what magnitude?
- p.227: “The TAC is divided evenly for harvesters north of 46°30’M ...”. Is this an IQ fishery? Should it be included if so?
- p. 228 “...and quota adjustments in areas that show a flux in population demographics.” This statement could be clarified,
- p.237: with respect to gear modification for salmon bycatch: what are the regulatory measures with respect to bycatch of salmon? What data, if any, is there on salmon bycatch?
- P.243: (first sentence) DFO also has a New Emerging Species Policy with similar objectives as DFLR which can be captured.
- p.244: regarding DFO RV study. It may be useful to describe the RV study itself. “No RV catch locations during this period were within 10km of proposed cage sites.” This is misleading because of the structure of the RV survey (random stratified); so it may not necessarily mean there was no catch, it may just mean that no survey went within 10km of cage, and therefore no catch would have been recorded.

4.4.2.4 Aquaculture

- p.251: Are there are recent data for primary product value for muscles post 2007.

4.4.2.6 Indigenous Fisheries

- p.258: second sentence: there are 5* indigenous groups. MAMKA is **not** an indigenous group- it is an AAROM (Aboriginal Aquatic Resource and Oceans Management) body.
- Give content to the location of these groups- Nunatsiavut, NCC, and Innu are all in Labrador

C&P comments

Under section 2.8.5 (Lost/Estranged Gear), it talks about gear breaking free and becoming a navigational hazard and a source of entanglement with other fishing gear. I would suggest another source of entanglement is with Marine Mammals and Sea Turtles; especially given that there have been past sightings of NARW in Placentia Bay. This can be linked to section 3.3 (Valued Environmental Components) and perhaps consideration of entanglements is already covered here. However, Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.

Section 7.3.3 (Marine Mammals) and 7.3.4 (Sea Turtles) does discuss entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. The same can be said for table 7.12 and 7.13.

Table 7.23 is an appropriate place to capture the lost/estranged gear as a potential interaction with marine mammals and sea turtles and table 7.24 would capture the applicable mitigations.

Page 175 (page counter in pdf not document page number) – main text that “serious security breeches will be handled by Fisheries Officers”. This is not accurate, security breaches will have to be handled by RCMP not Fishery Officers.

Richards, Dale E

De: Hamoutene, Dounia
Envoyé: June-26-18 4:32 PM
À: Richards, Dale E
Cc: Meade, James; Parrill, Erika
Objet: Concluding remarks- Suggestion

Hi all,

I was discussing the Grieg CSAS with staff and I think it is missing a concluding statement (you have done a great job considering that the comments came in different styles with different angles etc...) for readers (and regulators) to use: Something like: Overall the science review concludes that the level of certainty in conclusions on risk characterisation as per the Grieg EIS report is insufficient requiring additional information and/or sampling as per the points detailed below: (etc. in doc)

Thanks again
Cheers,

Dounia Hamoutene, PhD
Research scientist/Chercheure and Section Head/Chef de section
Aquaculture, Biotechnology and Aquatic Animal Health Section
Section Aquaculture, Biotechnologie et Santé Animale
Science Branch/Branche scientifique
Department of Fisheries and Oceans/ Département des Pêches et Océans
Tel: 709 772 5872
Fax: 709 772 5315

Hi Erika,

One quick update to address is:

P22: it should read: "measurements at only one point for each site" (not BMA).

Thanks,

Andry

From: Parrill, Erika

Sent: 2018-June-22 2:46 PM

To: Richards, Dale E; Hamoutene, Dounia; Ratsimandresy, Andry; Donnet, Sebastien G; Grant, Carole; Bradbury, Ian R; Gregory, Robert; Dalley, Kate L; McKenzie, Cynthia; Johnson, Roger

Cc: Korchoski, Connie; Meade, James; Kelly, Jason; Dempson, Brian

Subject: For your review - Draft Science Response - Grieg PB Aquaculture EIS

Hello,

Please see attached for the Draft Science Response which we will review at Monday's meeting.

-Erika

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309

From: Hendry, Christopher
Sent: June-26-18 9:25 PM
To: Parrill, Erika
Subject: RE: Updated Grieg Science Response
Attachments: DRAFT Grieg PB Aquaculture EIS SRR - Tracked Changes.docx

On the road... sorry. See attached. Comments tracked.

From: Parrill, Erika
Sent: June 25, 2018 4:31 PM
To: Gregory, Robert; Hamoutene, Dounia; Donnet, Sebastien G; Ratsimandresy, Andry; Dalley, Kate L; Grant, Carole; Bradbury, Ian R; Hendry, Christopher; McKenzie, Cynthia
Cc: Richards, Dale E; Meade, James
Subject: Updated Grieg Science Response

Hello,

Please see attached for the updated Grieg Science Response from today's meeting.

If you could review the attached comment bubbles and provide the outstanding information to me by CoB Tuesday it would be greatly appreciated. Plan is then to send a new version to everyone to review on Wednesday with a very quick turnaround.

Cheers,
Erika

[illegible]

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Ecosystems and
Oceans Science

Sciences des écosystèmes
et des océans

Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that DFO Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment website at the following link:

http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 – Project Rationale
 - Section 2.4.3 – Land-based Facility (RAS hatchery)
 - Section 2.4.4 – Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 – Physical Environment
 - Section 4.2.3 – Fish and Fish Habitat
 - Section 4.2.4 – Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat VEC Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 – Wild Salmon VEC
 - Section 7.9.2 – Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret, likely due to the experience of the proponent with this type of project. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation.

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how this will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics/routes. Additional information is required on mitigation measures for biosecurity risks and invasive species. This seems contrary to the purpose of creating BMAs.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by an remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. What frequency will the ROV monitor the cages (e.g., monthly monitoring, ROV to be shared between BMAs)? Daily?

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the

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Comment [CH1]: In the document, they mention that while crossing multiple BMAs, a minimum distance of 1km away from any cages would be maintained to minimize such risks

Comment [PE2]: Erika to follow-up with Sebastien regarding gear, SOPs for others in area

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Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee felt it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species and there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on our measurements the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once they've reached ~80% satiation. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 19892). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to

Comment [CH3]: This has not been seen in NL region. A single "odd looking" fish was seen in Grandy's Brook, 100km away, within the last five years, but has never been confirmed as a farmed fish.

Newfoundland and Labrador Region

be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information/-estimate.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Please confirm/-clarify.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 11. The rationale for the project is weak. While there may very well be increased demand for farmed salmon by 2030 (along with many other commodities), there is no specific requirement whereby this demand needs to be satisfied by producing salmon at Placentia Bay. Although Placentia Bay may provide an excellent location for the production of farmed fish, it has already been questioned whether this could flood current markets, especially if it becomes more challenging getting fish into the US market, notwithstanding the potential impacts it could have on local fisheries resources, particularly Atlantic Salmon.

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. How consistent are these results?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway lists the two biggest threats as introgression between escaped farmed salmon with wild salmon and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is expected that, overall, triploids still make up a relatively small amount of the total production of farmed salmon in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased

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Comment [PE4]: Triploids are not widely used in Norway
Introgression is #1 threat in Norway

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

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Page 14. "Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon." This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach would logically begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: "In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay" is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Comment [PE5]: Not in reference list

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Trusty. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

Comment [CH6]: Norwegian Fishery Institute is referenced in the document as having carried out a five-year study showing equivalent or favourable results for triploids over diploids.

Comment [PE7]: Not in reference list

Page 16. "Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)." The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reconsidered.

Comment [PE8]: Concern because of baseline data and should be reviewed during NL site licensing process

Page 16. "Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern." As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that "triploid female salmon do not enter freshwater", however, it states here that "the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes." Revisit and clarify for consistency.

Comment [CH9]: This proposal is only for all-female production, so thus would remove any confusion from this section

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used, yet.

Page 45. It states that Greig-Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts wouldn't be recommended in areas of hypoxia due to ...

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Comment [CH10]: A simple comment that skirts would not be recommended in areas of low oxygen could suffice.

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Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. "Typically once a year, Greig-Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..." This would imply that all nets are replaced approximately every year. Please revisit and confirm and explain why once a year.

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Page 64. "If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats." Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapees, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. What happens to the lumpfish when they get larger? There should also be some discussion regarding the transfer of pathogens/disease from lumpfish to salmon.

The stock origin of the lumpfish (cleaner fish) is not clear. Also, the density of lumpfish (i.e., 16,000 per cage) appears very high. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. "Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated." These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. While it is assumed that Grieg staff are experienced in this process, examples of past successful transfers and rates of accident/losses would also be useful in this context.

Comment [PE11]: Comparison with SOPs

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Page 76. "The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination." It is unclear how this will be achieved as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient

Newfoundland and Labrador Region

as pathogens could be present in a given BMA and then transmitted to another BMA. The proposed logistics seem contrary to the purpose of creating BMAs. Relatedly, on page 98: "Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination." However, they will use the routes crossing BMAs, as shown in Figure 2.53, thereby not really mitigating risk of cross-contamination.

Comment [PE12]: Compare with section in Exec Summary

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that 'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...' Please revisit and clarify for consistency.

Page 92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites," exceeding DFO's own recommendation of >30 km is inaccurate. In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Comment [PE13]: Not really recommendation – DFO Science stated this in triploidy Science Response (p.g 9).

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: "In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality" is misleading unclear as only one intense winter could be problematic. A recent example is the wintersuperchill event in 2014 which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past

Comment [PE14]: Is this risk to individual fish or environmental risk?

Newfoundland and Labrador Region

winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland shelf) region?

Page 100. "A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Comment [PE15]: Do we have a reference?

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment is lacking in detail and seems overly optimistic that there would be little to no problems. The "assessment" is thin.

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Section 3.0 – Effects Assessment Methodology

Page 128. Economy: Training, Employment and Business is not a "VEC" in the conventional context of an EIS. This information is acceptable from an economics context, but it does not belong in the ecological portions of the report. This pattern is repeated at several points in the document in Sections 3, 4, & 7.

Page 130. Project Area. The Marine Industrial Park may have runoff from the facilities located there under some scenarios, with a potential for runoff into the marine environment. However, there is no mention or evaluation of the potential for this outcome. It is difficult to believe the probability of this scenario is zero, as the wording in the text implies.

Comment [PE16]: Check with author to possibly delete. Need to change tone of paragraph

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Newfoundland and Labrador Region

Page 130. Study Area. It states that *"The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA"* and that *"This is considered the maximum extent wherein there is potential for effects of the Project to occur..."* Although the EA Committee felt it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

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Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Location of Rivers. The document states that *"...the mouths of the majority of scheduled and non-scheduled salmon rivers in Placentia Bay are located >20 km from a proposed sea cage site"*, whereas earlier in the EIS (p. 96) it states that *"the majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* Please revisit and clarify for consistency.

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled over the years, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation

Comment [PE17]: Need to reword as potential for wild salmon to be impacted outside study area. Proponent shouldn't say "maximum extent" as it gives impression effects will ONLY happen within study area. We have evidence to suggest impact may happen outside study area as salmon do leave PB and may interact with wild salmon.

Even if fish don't escape, could send disease to other salmon from Mar, Glif, etc as they do enter the Bay. Need to get reference from Ian.

Newfoundland and Labrador Region

modeling of the area, published by Ma et al. (2012) is not even referenced. Appendix D (Fish and Fish Habitat Component Study) states: "Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important." This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. Using tides only, one could represent most of the current variability with 1 month of data (i.e. spring and neap cycle) but a longer time-series is necessary to be representative. Wind forcing and the Labrador Current are variable on a timescale of days to seasons; again implying the need for long time-series. Consequently, the data collected for this study and presented in Table 4.5 are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Comment [PE18]: Follow up with Andry

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Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

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Page 145. Flood and Tidal Zones. "During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights." A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources (e.g. xxx). For example: <http://navigator.oceansdata.ca/public/>

Comment [PE19]: Follow up with Sebastien

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability would be helpful and should be provided in these figures.

Comment [PE20]: How do we cite this?

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels. There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around

Comment [PE21]: Get reference from Cynthia

Newfoundland and Labrador Region

PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;

2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where ~~this data is~~ these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this is already known from studies performed in Placentia Bay (see Matheson et al. 2016). The evidence for this is rather conclusive and well documented, and the supporting paper has been published for two years. The proponent should not cite "pers. comm." sources when published accounts from the area are readily available.

Additionally, why present information about eelgrass restoration only? Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014).

Comment [PE22]: Proponent needs to clarify. Need to reword with Kate

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

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Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is considered as a concern or not.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if hHabitat should be was discussed at a larger spatial scale using existing information (see XXX).

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4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three (3) generations. The authors of the COSEWIC report also clearly indicated that with respect to sSouth Newfoundland, had the analysis extended back just one (1) single year (i.e.: over 16_ years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in Newfoundland and LabradorNL. A retrospective analysis of salmon returns to Conne River for the years 1976_—1985 (10_ year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first 4-four years of the fish counting fence operation (1986_—1989) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided here.

Comment [PE23]: Follow up with Aquaculture Section re. references if we need to obtain more data outside of 100 m (100 m was decided based on DFO Science previous suggestions on footprint).

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Newfoundland and Labrador Region

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least one year or more two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al., 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture (disease, parasites) may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion is weak requires more discussion and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). The general consensus is that Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. Use of angling data, however, can be problematic. There are reasons why stock assessments are not routinely carried out on rivers for which only recreational catch data are available. These include, numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "is potentially quite risky."

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps regarding cumulative effects are also significant exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents in particular) represents a very significant data gap that should be acknowledged and addressed. Water structure seasonality (i.e.: temperature and salinity) are also data gaps that still need to be addressed, particularly salinity.

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Comment [PE24]: Main issues: #1 – ocean currents; #2 - salinity

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. *"Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)."* The correlation could not be found in the document cited.

Superchill events have already occurred on the south coast of Newfoundland in 2014 as noted in the EIS. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. *"Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification."* The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; how is the term "adequate" defined in this context?

Page 352. Algal Blooms. This section of document cites DFO 2010c many times (almost the only reference and the source of the Harmful Algal Bloom (HAB) map). This is not included in the references and the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. The information appears to be correct, although likely a little underestimated, as the finfish aquaculture industry on the south coast considers HABs a concern, and it is certainly a major issue in BC-British Columbia with increasing concern in the NL Region.

The document refers to the potential for toxic algal blooms but states that reports of farmed fish mortalities associated with toxin-producing dinoflagellates are comparatively infrequent. Interestingly, Greig salmon farms in British Columbia recently lost 250,000 salmon owing to toxic algae.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, simply lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant (NS), yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "NSnot significant".

Comment [PE25]: Not in reference list

Is this the correct reference?

LGL. 2018. Wild Atlantic Salmon. Component Study for the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project. LGL Rep. FA0144-1. Rep. by LGL Limited, St. John's, NL for Greig NL, Marystown, NL. 71 p. + appendix.

Comment [PE26]: Can be found in following references: xxx

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Comment [PE27]: Get new wording from Sebastien

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Comment [PE28]: Despite concern in BC and other areas in the world – increasing concern due to trend ... but has not yet been seen to date in NL.

Main point is that there is increasing concern.

Newfoundland and Labrador Region

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. entirely too short) the estimated benthic loading of carbon provided in this section cannot really be trusted may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)." They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.*

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles." As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO AAR (Aquaculture Activities Regulations) (AAR) will determine compliance.*

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Clarify how monitoring will be able to do this? Unless there is some action that will be taken depending on the results of the monitoring (i.e., some threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Comment [PE29]: Monitoring isn't a mitigation measure (feeds into compliance).

Explain how usage of tools will demonstrate the issue and then what mitigation measures they would take to address issue (e.g. follow AAR rules)

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European*

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

salmon and wild Newfoundland salmon." There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc... The document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may simply have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Comment [PE30]: Ian to send reference

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be replaced with 'commonly'-deleted.

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, yet nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that a ~~lot~~ many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The authors seem to be mixing up juvenile and adult surveys. Also "older individuals" is not correct; these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 survey either. Interestingly, DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Comment [PE31]: Reword and say that Proponent needs to clarify

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Page 439. There is a statement: *"...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon."* is an overstatement. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

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Comment [PE32]: Yes it would have a large effect (e.g. only 20,000 wild salmon on south coast and a 160,000 escape of farmed fish would have a significant effect).

e.g. highly unlikely that an escape of this magnitude would not have a large effect

their confidence level is incorrect

Comment [PE33]: Shouldn't this be higher?

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon, yet the level of confidence associated with this prediction is medium.

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. What about verifying effects due to disease/pathogens, sea lice, ecological interactions, etc?

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Page 476. Accidental Events. Again, Ssampling would involve collecting and analyzing blood samples. MAny monitoring of impacts would likely be undertaken by DFO in collaboration with Greig-Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: “Overall, planned Project activities on the WS-wild salmon VEC were predicted to be not significant”. While the proponent has outlined in detail the various mitigation measures that will be implemented, many of which are to be commended, a more realistic conclusion could be: Overall, while numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

Comment [PE34]: What was in EA guidelines regarding requirement to collect baseline data?

Need longer time-series to determine how effective Proponent's deposition modelling is.

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~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

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There is no mention of the potential effects of farmed escapes on wild salmon. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

Comment [PE35]: We're making conclusions on the Project and the aquaculture industry and not the EA itself. Need to ensure we are not making wide sweeping statements and stick to scope

Revision to para 1: Proponent can't say non-significant effect due to data and reasons stated above.

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7.9.2 Accidents and Malfunctions

Page 480. It is difficult to see how the proponent came to the conclusion that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant. A high level of uncertainty remains as to the ultimate risk. The level of confidence cannot be medium, at best it would be low.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect '*alter genetic integrity...*' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Comment [PE36]: Suggest now including Gamish 2017 returns. (which should be published in SAR this week).

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Ssalmon never

Newfoundland and Labrador Region

spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are multi-sea-winter salmon (MSW).

Page 5. It states that *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of our the Department's counting facilities on the south coast, Garnish River. These obviously resulted from escape incidents and this information should be reported and discussed in the EIS.

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey"*. This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence.

Newfoundland and Labrador Region

Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data ~~is~~are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful mainly because a recapture plan wasn't in place, due to operational and environmental issues which resulted in delays in initiating recapture efforts.

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Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from Salmonid DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."*

Newfoundland and Labrador Region

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: "*siting of sea cages at locations with suitable currents and depth to distribute organic waste*", which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Greig-Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it a one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Page 8. The basis for using 1,124 kg/cage/day feed input is not clear. Is it the maximum load (worst case scenario as requested by AAR) or something else?

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e., prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. "*The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track.*" The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Newfoundland and Labrador Region

Page 36. "In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay." A reference should be provided here and where other such statements are made. For example the statement that follows: "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."

Page 36. "Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters." This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (pg. 5) states: "There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."

Page 36. Please provide references for the datasets that have already been documented (e.g. MUN-Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. "At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m." It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference, Mooring name?). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Conclusions

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- The ocean current time-series used for this study are too short to give statistically robust/satisfactory estimates of dispersion.

Comment [PE37]: Not in reference list

Are these the correct references:

Hart, S.R., Blusztajn, J., Dick, H.J.B., Meyer, P.S. and Muehlenbachs, K. (1999). The fingerprint of seawater circulation in a 500-meter section of ocean crust gabbros. *Geochimica et Cosmochimica Acta* 63: 4,059-4,080 with this as hyperlink: <https://earthref.org/ERR/n:19,b:aaaa0000019tab09/>

Schillinger, D.J., DeYoung, B., and J. Foley. 2000. CTD data from the Newfoundland coast: 1986 and 1987. *Dept. Physics and Physical Oceanography, Memorial University*. 31 p.

Comment [PE38]: Change "misleading" to "inaccurate"

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate and misleading statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. This is unlikely. The data does not support this conclusion.

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The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each BMA site) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the proponent;

- As the Environmental Effects Monitoring and Follow-up Program (EEMP) has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

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Approved by

B. R. McCallum
Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

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Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

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DRAFT

This Report is Available from the

Center for Science Advice (CSA)
Newfoundland and Labrador Region
Fisheries and Oceans Canada
PO Box 5667
St. John's, NL, A1C 5X1
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MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page
couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.

Parrill, Erika

From: Parrill, Erika
Sent: Tuesday, June 26, 2018 9:35 PM
To: Grant, Carole
Subject: RE: EIS

Thanks Carole ☺

><(((°))>~><(((°))>~><(((°))>~><(((°))>~><(((°))>~><(((°))>

Erika Parrill
Centre for Science Advice – NL Region

From: Grant, Carole
Sent: Tuesday, June 26, 2018 11:33 AM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: FW: EIS

References from Ian.

From: Bradbury, Ian R
Sent: June-26-18 10:59 AM
To: Grant, Carole
Cc: Dempson, Brian
Subject: EIS

I have inserted the requested references and attached both papers here as well.

Ian

Parrill, Erika

From: Parrill, Erika
Sent: Tuesday, June 26, 2018 9:49 PM
To: Dalley, Kate L
Cc: Richards, Dale E
Subject: RE: Updated Grieg Science Response

Thank you Kate! ☺

><(((o>~><(((o>~><(((o>~><(((o>~><(((o>

Erika Parrill
Centre for Science Advice – NL Region

From: Dalley, Kate L
Sent: Tuesday, June 26, 2018 12:32 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>; Richards, Dale E <Dale.Richards2@dfo-mpo.gc.ca>
Subject: RE: Updated Grieg Science Response

Hi Erika, Dale,

Please see my comments below. I am around if you need more clarification.

Re: [PE18]:

This section is intended to serve as an overview of the existing environment. My concern here is that it is unclear why 'restoration' of eelgrass is a topic when they have not yet discussed eelgrass within the bay. May I suggest:

"Given that this section is intended to describe the existing environment in the bay, we suggest 1) that the proponent first present information about eelgrass within the bay - this may be an appropriate addition to the marine benthos or benthic habitat sections (see Rao et al. 2014 and also DFO 2009), this addition will assist with 2) clarifying why the restoration of eelgrass is a section within the document"

Re: [PE19]:

I renege my comment here. I think it comes back to the formatting of the document – the materials that I am requesting do exist in other sections. It was not my intent to request larger scale data collection by the proponent, especially if regulations exist (although I personally would support it!). I found the info in this section to be localized and not inclusive but a step back from the doc helped me see the info I am requesting is presented elsewhere.

All that, and I still believe that a reference in this section regarding the suggested distance sampling regulations, and an indication that they met them would be helpful. (I will let Aquaculture comments be the authority here).

Hope this helps,
Kd

From: Parrill, Erika
Sent: June 25, 2018 4:31 PM
To: Gregory, Robert; Hamoutene, Dounia; Donnet, Sebastien G; Ratsimandresy, Andry; Dalley, Kate L; Grant, Carole; Bradbury, Ian R; Hendry, Christopher; McKenzie, Cynthia

Cc: Richards, Dale E; Meade, James

Subject: Updated Grieg Science Response

Hello,

Please see attached for the updated Grieg Science Response from today's meeting.

If you could review the attached comment bubbles and provide the outstanding information to me by CoB Tuesday it would be greatly appreciated. Plan is then to send a new version to everyone to review on Wednesday with a very quick turnaround.

Cheers,

Erika

><(((o>~><(((o>~><(((o>~><(((o>~><(((o>~><(((o>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309

Table of Concordance

Guideline Requirement		EIS	
Section	Title	Vol. / Section	Title
Executive Summary			
	Executive Summary	Vol. 1	Executive Summary
	Table of Concordance	Vol. 1	Table of Concordance
Section 1: Introduction			
1.1	Name of the Undertaking	Vol. 1 1.0	Introduction
1.2	The Proponent	Vol. 1 1.1	The Proponent
1.3	Overview of the Undertaking	Vol. 1 2.1	Overview of the Undertaking
1.4	Purpose of the EIS	Vol. 1 1.2	Purpose of the EIS
Section 2: The Proposed Undertaking			
2.1	Study Areas		
a	Current land and marine use in the area including the locations of the nearest temporary and permanent dwellings, commercial and industrial sites, scheduled and non-scheduled salmon rivers, commercial and recreational fishing areas and navigation routes.	Vol. 3 Grattan et al. 2018 Vol. 1 4.4	Land and Resource Use
b	The environmental significance and value of the geographical setting in which the project will take place, and the surrounding area.	Vol. 3 Grattan et al. 2018	
c	Environmentally sensitive areas, such as national, provincial, and regional parks and reserves; EBSAs; estuaries, rivers, and habitats of federally or provincially listed species at risk; and other sensitive areas.	Vol. 1 4.2.5 4.2.6 4.2.6.1 4.2.6.2	Species at Risk Sensitive Areas National, Provincial and Recreational Parks and Reserves Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA)
d	A description of local communities, including any sewage effluent and/or other water discharges that may adversely affect the project.	Vol. 1 4.2.2.7	Water Quality
e	A description of the hatchery site and landing site for transferring smolt to the well boat.	Vol. 1 2.4.3 2.4.3.2	Land-based Facility (RAS Hatchery) <u>Operations and Maintenance</u> <u>Fish Transfer to Well Boat</u>
f	A description of sea cage sites and navigation routes: from hatchery to sea cage sites; between sea cage sites; from marine docking stations to sea cage sites; and from sea cage sites to fish processing facility.	Vol. 1 2.4.4.2	<u>Operations and Maintenance</u> <u>Resupply</u>
g	Delineation of the four proposed BMAs and a description of the process that leads to the approval and designation of BMAs by the Department of Fisheries and Land Resources.	Vol. 1 2.4.2.2	Marine
2.2	Rationale for the Undertaking	Vol. 1 2.4.1 2.4.1.1	Project Rationale Rationale for Proposing European-strain Sterile Triploid Atlantic Salmon
2.3	Project Description	Vol. 1 2.4	Project Description
2.3.1	General Layout		
a	The land-based hatchery facility and associated buildings,	Vol. 1	

**Pages 675 to / à 696
are withheld pursuant to section
sont retenues en vertu de l'article**

68(a)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Parrill, Erika

From: Parrill, Erika
Sent: Wednesday, June 27, 2018 8:35 AM
To: Hendry, Christopher
Subject: RE: Updated Grieg Science Response

Thanks Chris ☺

><(((°~°)))>~><(((°~°)))>~><(((°~°)))>~><(((°~°)))>~><(((°~°)))>

Erika Parrill
Centre for Science Advice – NL Region

From: Hendry, Christopher
Sent: Tuesday, June 26, 2018 9:25 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: RE: Updated Grieg Science Response

On the road... sorry. See attached. Comments tracked.

From: Parrill, Erika
Sent: June 25, 2018 4:31 PM
To: Gregory, Robert; Hamoutene, Dounia; Donnet, Sebastien G; Ratsimandresy, Andry; Dalley, Kate L; Grant, Carole; Bradbury, Ian R; Hendry, Christopher; McKenzie, Cynthia
Cc: Richards, Dale E; Meade, James
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Cheers,
Erika

><(((°~°)))>~><(((°~°)))>~><(((°~°)))>~><(((°~°)))>~><(((°~°)))>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
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709-727-6309

Parrill, Erika

From: Parrill, Erika
Sent: Wednesday, June 27, 2018 8:43 AM
To: Gregory, Robert
Subject: RE: Updated Grieg Science Response

Thank you Bob ☺

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: Gregory, Robert
Sent: Tuesday, June 26, 2018 5:19 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: RE: Updated Grieg Science Response

Here you are...cheers, Bob

Dr. Robert S. Gregory, Research Scientist
Ecological Sciences Section
Fisheries & Oceans Canada
80 E. White Hills Rd., PO Box 5667 St. John's NL A1C 5X1 CANADA

1-709-772-4491 phone
1-709-772-5315 fax
email: Robert.Gregory@dfo-mpo.gc.ca

From: Parrill, Erika
Sent: June 25, 2018 4:31 PM
To: Gregory, Robert; Hamoutene, Dounia; Donnet, Sebastien G; Ratsimandresy, Andry; Dalley, Kate L; Grant, Carole; Bradbury, Ian R; Hendry, Christopher; McKenzie, Cynthia
Cc: Richards, Dale E; Meade, James
Subject: Updated Grieg Science Response

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Cheers,
Erika

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Erika Parrill, M.A., B.A., B. Comm.
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Centre for Science Advice – NL Region
709-727-6309

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Hendry, Christopher

From: Hendry, Christopher
Sent: June-27-18 3:15 PM
To: [REDACTED]
Cc: [REDACTED]
Subject: Re: Current Monitoring Requirements for Aquaculture

[REDACTED]

Our regulation is not prescriptive on most of the data that feed a deposit on all model. Advice I have been giving to ensure a model is most useful is that a minimum of three depths would be required:

- 1 - point of deposition - bottom of net
- 2 - near bottom
- 3 - one in between

The more depths would add better resolution to model output, however the reg is not prescriptive.

As for duration, it would be ideal that a complete lunar cycle be recorded during the time of year when peak biomass would take place. Again, the reg is not prescriptive on this.

I hope this helps.

From: [REDACTED]
Sent: Wednesday, June 27, 2018 10:52
To: Hendry, Christopher
Cc: [REDACTED]
Subject: Current Monitoring Requirements for Aquaculture

Hi Chris,

Do you have any recommendations for current monitoring for Placentia Bay? What depths do we need to profile? Is surface sufficient? Etc

After reviewing the aquaculture site licence process we know it has to be done and profiled but we are unsure of exactly what specifications is needed?

Thanks,

s.19(1)

[REDACTED]

Grieg NL
PO Box 457

205 McGettigan Blvd.
Marystown, NL A0E 2M0

Tel: 709.279.3440
Cell: [REDACTED]
Internet: www.griegnl.ca

s.19(1)



No further information has been removed or severed from this page



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Oceans Science

Sciences des écosystèmes
et des océans

Newfoundland and Labrador Region

Canadian Science Advisory Secretariat
Science Response 2018/nnn

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment [website](#).

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 - Project Rationale
 - Section 2.4.3 - Land-based Facility (RAS hatchery)
 - Section 2.4.4 - Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 - Physical Environment
 - Section 4.2.3 - Fish and Fish Habitat
 - Section 4.2.4 - Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 - Wild Salmon VEC
 - Section 7.9.2 - Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation (DFO 2016).

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and invasive species.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs)

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as

Commentaire [PE1]: Sebastien/Cynt
hia – please review

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

salmon are a highly migratory species. Also, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information..

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested..

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile (DFO 2016), although on p.17 it states that there will be 100% sterility.

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway, lists the two largest threats to wild salmon as being introgression between escaped farmed salmon with wild salmon, and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is assumed that triploids and not widely used in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Page. 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach should begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is

Commentaire [PE2]: Sentence in 2016 doc we can use?

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)." The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reevaluated.*

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern." As stated previously, this may not apply to all BMAs.*

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater"*, however, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used.

Page 45. It states that Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts would not be recommended in areas of low oxygen.

Commentaire [PE3]: Not in reference list – check with Brian

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Tlusty. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..."* This would imply that all nets are replaced approximately every year. Additional detail is requested on net replacement and maintenance.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. Additional details are required on the usage of lumpfish (e.g. size and non-feeding lumpfish protocols, and transfer of pathogens/diseases from lumpfish to salmon).

The stock origin of the lumpfish (cleaner fish) is not clear. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how cross-contamination will be avoided as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination."* However, the Proponent will use routes crossing BMAs, as shown in Figure 2.53, thereby not mitigating risk of cross-contamination.

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...'* Please revisit and clarify for consistency.

Page92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: *"In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality"* is unclear as only one intense winter could be problematic. A recent example is the superchill event in 2014, which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland Shelf) region?

Page 100. *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Commentaire [PE4]: Do we have a reference? AI – just add website hyperlink ask salmonids if I can't find

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail and seems optimistic that there would be little to no problems.

Section 3.0 – Effects Assessment Methodology

Page 130. Project Area. Potential for runoff from the Marine Industrial Park due to a tank rupture was not included in the evaluation of the project area. This should be revisited.

Page 130. Study Area. It states that "The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA" and that "This is considered the maximum extent wherein there is potential for effects of the Project to occur..." Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with 1 month of data (i.e. spring and neap cycle). In Newfoundland, Wwind forcing and the Labrador Current are variable on timescales of days to seasons (or more); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

Page 145. Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (MacKenzie et al. 2016). There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this information is available from studies performed in Placentia Bay (see Matheson et al. 2016).

Information is presented in this section regarding eelgrass restoration only. Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014), and information on existing eelgrass sites within the bay should be provided. In addition, and

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is a concern.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. This is recommended in light of the lease sizes, the proximity of sites to MPAs, and the overall potential cumulative effect of deposition after stocking. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. The authors of the COSEWIC report also indicated that with respect to south Newfoundland, had the analysis extended back just one single year (i.e. over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in NL. A retrospective analysis of salmon returns to Conne River for the years 1976-85 (10-year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first four years of the fish counting fence operation (1986-89) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Québec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al. 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. The use of angling data, however, can be problematic. Stock assessments are not routinely carried out on rivers for which only recreational catch data are available. Reasons include: numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*" The correlation could not be found in the document cited.

As noted in the EIS, superchill events have already occurred on the south coast of Newfoundland in 2014. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "*Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification.*" The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; the term "adequate" should be defined in this context.

Page 352. Algal Blooms. This section of document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant, yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "not significant".

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapes on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. too short) the estimated benthic loading of carbon provided in this section may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)." They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.*

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO Aquaculture Activities Regulations (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be deleted (place reference here).

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young

Commentaire [PE5]: Carole - Need reference to justify why delete sometimes.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys. DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: "...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon" is not substantiated. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon. On the contrary, an escape of 160,000 farmed salmon would likely have a significant effect on the wild salmon population (approximately 20,000 fish). Such a statement should have a higher level of confidence than that indicated in the EIS document (medium).

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions,

Page 476. Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the wild salmon VEC were predicted to be not significant". The proponent outlined in detail the various mitigation measures that will be implemented, many of which are to be commended. Although numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are statements that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

Page 480. It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, at best it would be low.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect 'alter genetic integrity....' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are MSW.

Page 5. It states that "Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit." It would be useful if these other attributes were described. It also states that "since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon." There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that "the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages" and that this could affect migration patterns if wild salmon "choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey". This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Commentaire [PE6]: Suggest now including Garnish 2017 returns. (which should be published in SAR this week).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."* However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste"*, which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here and where other such statements are made. For example the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (page 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference, Mooring name). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Conclusions

Overall, the EIS documents are extensive and the topics considered within the relevant sections are generally appropriate. However, the level of certainty in the conclusions on risk characterization is insufficient and requires additional information and/or sampling.

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- Additional physical environmental data should be collected at each site. A longer time-series of ocean currents, in particular, should be collected as well as profiles of water salinity; the former due to its importance for dispersion modeling and monitoring, and the latter due to its importance on sea-lice life cycle.
- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. The data does not support this conclusion.

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each site) was used to make conclusions regarding suitable siting locations.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

The follow-up program proposed by the proponent;

- As the EEMP has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

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Newfoundland and Labrador Region

Canadian Science Advisory Secretariat
Science Response 2018/nnn

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment [website](#).

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 - Project Rationale
 - Section 2.4.3 - Land-based Facility (RAS hatchery)
 - Section 2.4.4 - Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 - Physical Environment
 - Section 4.2.3 - Fish and Fish Habitat
 - Section 4.2.4 - Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 - Wild Salmon VEC
 - Section 7.9.2 - Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation (DFO 2016).

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.

Commentaire [PE1]: Sebastien/Cynt
hia – please review

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs)

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

salmon are a highly migratory species. Also, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information..

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested..

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile (DFO 2016), although on p.17 it states that there will be 100% sterility.

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway, lists the two largest threats to wild salmon as being introgression between escaped farmed salmon with wild salmon, and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is assumed that triploids are not widely used in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Page. 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach should begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is

Commentaire [PE2]: Sentence in 2016 doc we can use?

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)." The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reevaluated.*

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern." As stated previously, this may not apply to all BMAs.*

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater"*, however, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used.

Page 45. It states that Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts would not be recommended in areas of low oxygen.

Commentaire [PE3]: Not in reference list – check with Brian

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Tlusty. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..."* This would imply that all nets are replaced approximately every year. Additional detail is requested on net replacement and maintenance.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. Additional details are required on the usage of lumpfish (e.g. size and non-feeding lumpfish protocols, and transfer of pathogens/diseases from lumpfish to salmon).

The stock origin of the lumpfish (cleaner fish) is not clear. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how cross-contamination will be avoided as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination."* However, the Proponent will use routes crossing BMAs, as shown in Figure 2.53, thereby not mitigating risk of cross-contamination.

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...'* Please revisit and clarify for consistency.

Page92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: *"In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality"* is unclear as only one intense winter could be problematic. A recent example is the superchill event in 2014, which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland Shelf) region?

Page 100. *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Commentaire [PE4]: Do we have a reference? AI – just add website hyperlink ask salmonids if I can't find

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail and seems optimistic that there would be little to no problems.

Section 3.0 – Effects Assessment Methodology

Page 130. Project Area. Potential for runoff from the Marine Industrial Park due to a tank rupture was not included in the evaluation of the project area. This should be revisited.

Page 130. Study Area. It states that "The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA" and that "This is considered the maximum extent wherein there is potential for effects of the Project to occur..." Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with 1 month of data (i.e. spring and neap cycle). In Newfoundland, wind forcing and the Labrador Current are variable on timescales of days to seasons (or more); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

Page 145. Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (MacKenzie et al. 2016). There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this information is available from studies performed in Placentia Bay (see Matheson et al. 2016).

Information is presented in this section regarding eelgrass restoration only. Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014), and information on existing eelgrass sites within the bay should be provided. In addition, and

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Commentaire [CHM5]: Tsk tsk

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is a concern.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. This is recommended in light of the lease sizes, the proximity of sites to MPAs, and the overall potential cumulative effect of deposition after stocking. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. The authors of the COSEWIC report also indicated that with respect to south Newfoundland, had the analysis extended back just one single year (i.e. over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in NL. A retrospective analysis of salmon returns to Conne River for the years 1976-85 (10-year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first four years of the fish counting fence operation (1986-89) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Québec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al. 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. The use of angling data, however, can be problematic. Stock assessments are not routinely carried out on rivers for which only recreational catch data are available. Reasons include: numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*" The correlation could not be found in the document cited.

As noted in the EIS, superchill events have already occurred on the south coast of Newfoundland in 2014. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "*Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification.*" The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; the term "adequate" should be defined in this context.

Page 352. Algal Blooms. This section of document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant, yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "not significant".

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. too short) the estimated benthic loading of carbon provided in this section may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO Aquaculture Activities Regulations (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be deleted (place reference here).

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young

Commentaire [PE6]: Carole - Need reference to justify why delete sometimes.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys. DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: "...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon" is not substantiated. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon. On the contrary, an escape of 160,000 farmed salmon would likely have a significant effect on the wild salmon population (approximately 20,000 fish). Such a statement should have a higher level of confidence than that indicated in the EIS document (medium).

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions,

Page 476. Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the wild salmon VEC were predicted to be not significant". The proponent outlined in detail the various mitigation measures that will be implemented, many of which are to be commended. Although numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are statements that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

Page 480. It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, at best it would be low.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect '*alter genetic integrity...*' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are MSW.

Page 5. It states that "*Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit.*" It would be useful if these other attributes were described. It also states that "*since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon.*" There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that "*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*" and that this could affect migration patterns if wild salmon "*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey*". This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Commentaire [PE7]: Suggest now including Garnish 2017 returns. (which should be published in SAR this week).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."* However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste"*, which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here and where other such statements are made. For example the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (page 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference, Mooring name). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Conclusions

Overall, the EIS documents are extensive and the topics considered within the relevant sections are generally appropriate. However, the level of certainty in the conclusions on risk characterization is insufficient and requires additional information and/or sampling.

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- Additional physical environmental data should be collected at each site. A longer time-series of ocean currents, in particular, should be collected as well as profiles of water salinity; the former due to its importance for dispersion modeling and monitoring, and the latter due to its importance on sea-lice life cycle.
- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. The data does not support this conclusion.

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each site) was used to make conclusions regarding suitable siting locations.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

The follow-up program proposed by the proponent;

- As the EEMP has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Approved by

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

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*MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page
couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.*

Johnson, Roger

From: Kelly, Jason
Sent: Wednesday, June 27, 2018 6:08 PM
To: Johnson, Roger
Subject: Re: grieg

OK. Will.do both. Thanks.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Wednesday, June 27, 2018 5:17 PM
To: Kelly, Jason
Subject: Re: grieg

COB Thursday or a little later

Call me tomorrow I will get Bret to drive and we can talk or we can get together Friday am

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Kelly, Jason
Sent: Wednesday, June 27, 2018 1:24 PM
To: Johnson, Roger
Subject: grieg

Are you back tomorrow. Will we have time to chat before meeting with Jackie.

jason

Jason Kelly

A/ Manager – Regulatory Review
Fisheries Protection Program, Ecosystems Management Branch
Fisheries and Oceans Canada, Government of Canada
P.O. Box 5667, St. John's, NL A1C 5X1
Ph: (709) 772-4126
Email: jason.kelly@dfo-mpo.gc.ca

Parrill, Erika

From: Parrill, Erika
Sent: Thursday, June 28, 2018 1:01 AM
To: Richards, Dale E
Subject: Updated Grieg EIS
Attachments: Grieg PB Aquaculture EIS SRR - June 27 version + EDP edits.docx

Hi Dale,

See attached for the updated Grieg EIS. I've given it a thorough read-through and also incorporated some edits I received this evening from Cynthia and Brian.

I'll upload this version to our Shared Drive shortly.

Let me know if I need to make any further edits Thursday/create a yellow folder @ break/lunch if needed.

-Erika ☺

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309



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Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador NL Environmental Protection Act to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador NL Region of Fisheries and Oceans Canada (DFO) requested that Science undertake a review of specific sections of the Environmental Impact Statement EIS for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch DFO undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the PproponentProponent;
- The level of certainty in the conclusions reached by the proponentProponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponentProponent's methodologies and conclusions);
- The follow-up program proposed by the PproponentProponent; and
- Whether additional information is required from the PproponentProponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

Newfoundland and Labrador Region **Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.**

available on the Government of Newfoundland and Labrador NL's Department of Municipal Affairs and Environment [website](#).

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, results from the Regional Science Response Process (SRP) of June 26²⁵, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 - Project Rationale
 - Section 2.4.3 - Land-based Facility (RAS hatchery)
 - Section 2.4.4 - Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 - Physical Environment
 - Section 4.2.3 - Fish and Fish Habitat
 - Section 4.2.4 - Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 - Wild Salmon VEC
 - Section 7.9.2 - Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science's assessment of the risks associated with the proposed project identified a long list of significant uncertainties. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100%, and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature, and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation (DFO 2016).

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs).

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

salmon are a highly migratory species. Also, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true; most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc., will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 4-one year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for the Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed Pproject on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile (DFO 2016), although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016).

Commented [PE1]: Sentence in 2016 doc we can use?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in provide a better context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway, lists the two largest threats to wild salmon as being introgression between escaped farmed salmon with wild salmon, and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is assumed that triploids and are not widely used in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

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Commented [PE2]: Dale - I skimmed the Thorstad article and this is correct

Page. 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

would occur and hence a cautious approach should begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)."* The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reevaluated.

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern."* As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used.

Page 45. It states that Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts would not be recommended in areas of low oxygen.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 52. Regarding the statement that service vessels will assist with net changing, ~~are further information is required on whether~~ nets will be routinely changed, ~~and if so~~, on what frequency or under what conditions, or is it ~~just only~~ in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes."* This would imply that all nets are replaced approximately every year. Additional detail is requested on net replacement and maintenance.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being ~~tried~~ explored such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. Additional details are required on the usage of lumpfish (e.g. size and non-feeding lumpfish protocols, and transfer of pathogens/diseases from lumpfish to salmon).

The stock origin of the lumpfish (cleaner fish) is not clear. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc., is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how cross-contamination will be avoided as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination."* However, the Proponent will use routes crossing BMAs, as shown in Figure 2.53, thereby not mitigating risk of cross-contamination.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over ~~three~~3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that 'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes~~...~~'. Please revisit and clarify for consistency.

Page92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites." In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue~~...~~.

Page 99. The statement: "In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality" is unclear as only one intense winter could be problematic. A recent example is the superchill event in 2014, which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland Shelf) region?

Page 100. "A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to industry regulators, and should be made available to industry regulators. Consultation and cooperation between the proponent/Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - three³; 2014 - four⁴; 2017 - two²; and 2018 - two². In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location. However, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail and seems optimistic that there would be little to no problems.

Section 3.0 – Effects Assessment Methodology

Page 130. Project Area. Potential for runoff from the Marine Industrial Park due to a tank rupture was not included in the evaluation of the project area. This should be revisited.

Page 130. Study Area. It states that "The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA" and that "This is considered the maximum extent wherein there is potential for effects of the Project to occur..." Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate. However, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of data (i.e. spring and neap cycle in Newfoundland). Wind forcing and the Labrador Current are variable on timescales of days to seasons (or more); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 145. Flood and Tidal Zones. "During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights." A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and DFO's [Marine Environmental Data Section](#))

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (MacKenzie et al. 2016). There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around ~~Placentia Bay~~. It is important that Grieg for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that ~~they cannot simply report – they~~ in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The ~~proponent~~ Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, ~~they~~ the Proponent cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, ~~so it is particularly important to ensure that no AIS make it to the sites.~~ Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in ~~G~~green ~~C~~crab density, this information is available from studies performed in Placentia Bay (see Matheson et al. 2016).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Information is presented in this section regarding eelgrass restoration only. Eelgrass is considered an ecologically significant species (see DFO: 2009; Rao et al. 2014), and information on existing eelgrass sites within the bay should be provided. ~~In addition, and~~

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is a concern.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. This is recommended in light of the lease sizes, the proximity of sites to MPAs, and the overall potential cumulative effect of deposition after stocking. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. The authors of the COSEWIC report also indicated that with respect to south Newfoundland, had the analysis extended back just one single year (i.e. over 16 years) ~~s~~South Newfoundland would have met the criteria to be designated as "Endangered." Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in NL. A retrospective analysis of salmon returns to Conne River for the years 1976-85 (10-year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first four years of the fish counting fence operation (1986-89) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence (Moore et al. 1978). More discussion of historical and current studies should be provided.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Québec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al. 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. The use of angling data, however, can be problematic. Stock assessments are not routinely carried out on rivers for which only recreational catch data are available. Reasons include: numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*" The correlation could not be found in the document cited.

As noted in the EIS, superchill events have already occurred on the south coast of Newfoundland in 2014. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "*Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or eutrophication.*" The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; the term "adequate" should be defined in this context.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 352. Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

Section 7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Pproject on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant, yet the ~~proponent~~Proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "not significant."

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. too short) the estimated benthic loading of carbon provided in this section may be inaccurate (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the ~~proponent~~Proponent. However, at this stage only regulatory requirements through DFO Aquaculture Activities Regulations (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

organic material on the seabed. The sSame comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

Section 7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the Pproject on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

Section 7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be deleted (place reference here).

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safeescape-proof.

Commented [PE3]: Carole - Need reference to justify why delete sometimes.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 436. There is a reference to Verspoor et al. (2015), which states that “*smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks.*” It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The EIS document seems to mix-up juvenile and adult surveys. Also, the statement “older individuals” is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d’Espoir in the fall 2017 surveys. DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: “...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon” is not substantiated. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon. On the contrary, an escape of 160,000 farmed salmon would likely have a significant effect on the wild salmon population (approximately 20,000 fish). Such a statement should have a higher level of confidence than that indicated in the EIS document (medium).

Section 7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Page 476. Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

Section 7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: “Overall, planned Project activities on the wild salmon VEC were predicted to be not significant”. The ~~proponent~~Proponent outlined in detail the various mitigation measures that will be implemented, many of which are to be commended. Although numerous mitigation measures have been built into the proposed Project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d’Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are statements that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

7.9.2 Accidents and Malfunctions

Page 480. It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, at best it would be low.

Section 8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect '*alter genetic integrity...*' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, ~~then it should~~ then also report that salmon that spend more than one year at sea are MSW.

Page 5. It states that "*Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit.*" It would be useful if these other attributes were described. It also states that "*since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon.*" There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL, before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past ~~2-two~~ consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that "*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*" and that this could affect migration patterns if wild salmon "*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey.*" This was not mentioned and discussed in the main EIS document.

Commented [PE4]: Suggest now including Garnish 2017 returns. (which should be published in SAR this week).

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river.⁵⁷ However, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). ~~Again~~^{Again}, data are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by ~~Grieg NL~~^{the Proponent} to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4~~four~~ times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. "*Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom).*" However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 4~~one~~ month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 4~~one~~ year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: "*siting of sea cages at locations with suitable currents and depth to distribute organic waste*," which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping a few days time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides are a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Newfoundland and Labrador Region

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General Comment. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

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Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure-Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure-Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (page-p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term (vector-averaged) mean might be. The source of this information is unclear (e.g., reference, Mooring name). Please revisit and adjust the text accordingly.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented would be even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.

Conclusions

Overall, the EIS documents are extensive and the topics considered within the relevant sections are generally appropriate. However, the level of certainty in the conclusions on risk characterization is insufficient and requires additional information and/or sampling.

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- Additional physical environmental data should be collected at each site. A longer time-series of ocean currents, in particular, should be collected as well as profiles of water salinity; the former due to its importance for dispersion modeling and monitoring, and the latter due to its importance on sea-lice life cycle.
- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate statements are found in the reports.

The mitigation measures proposed by the ~~proponent~~Proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination. However, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the ~~proponent~~Proponent on the effects;

- Assessment of the risks associated with the proposed ~~P~~project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. The data does not support this conclusion.

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the ~~proponent~~Proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.

- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to ~~give~~ provide statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each site) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the ~~proponent~~ Proponent:

- As the EEMP has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; sampling in areas between the BMAs to provide information on presence of organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Whether additional information is required from the ~~proponent~~ Proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Approved by

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June XX, 2018

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

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couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.

Kelly, Jason

From: Kelly, Jason
Sent: June-28-18 8:32 AM
To: Johnson, Roger
Subject: Re: grieg

Yup. U call me when u ready. [REDACTED]

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Thursday, June 28, 2018 8:23 AM
To: Kelly, Jason
Subject: Re: grieg

Is 0930 ok

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Kelly, Jason
Sent: Thursday, June 28, 2018 8:16 AM
To: Johnson, Roger
Subject: RE: grieg

When is a good time to chat

jas

From: Johnson, Roger
Sent: June-27-18 5:17 PM
To: Kelly, Jason
Subject: Re: grieg

COB Thursday or a little later

Call me tomorrow I will get Bret to drive and we can talk or we can get together Friday am

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Kelly, Jason
Sent: Wednesday, June 27, 2018 1:24 PM
To: Johnson, Roger
Subject: grieg

Are you back tomorrow. Will we have time to chat before meeting with Jackie.

jason

s.16(2)(c)

Jason Kelly

A/ Manager – Regulatory Review
Fisheries Protection Program, Ecosystems Management Branch

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Johnson, Roger

From: Kelly, Jason
Sent: Thursday, June 28, 2018 9:49 AM
To: Pike, Kelly J
Cc: Johnson, Roger
Subject: Pre-meeting Grieg EA with Ray

Kelly,

Roger and I would like to meet with Ray ahead of our meeting with Jackie tomorrow (1pm). 30 minis in the morning would suffice

jason

Jason Kelly

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REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the Newfoundland and Labrador *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the Newfoundland and Labrador Region of Fisheries and Oceans Canada (DFO) requested that Science undertake a review of specific sections of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. Science Branch undertook a Science Response Process (SRP) for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the proponent;
- The level of certainty in the conclusions reached by the proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);
- The follow-up program proposed by the proponent; and
- Whether additional information is required from the proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated component studies and appendices. The EIS documents are

June 2018

Canada

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

available on the Government of Newfoundland and Labrador Department of Municipal Affairs and Environment [website](#).

This Science Response Report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Response Process (SRP) of June 26, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 - Project Rationale
 - Section 2.4.3 - Land-based Facility (RAS hatchery)
 - Section 2.4.4 - Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 - Physical Environment
 - Section 4.2.3 - Fish and Fish Habitat
 - Section 4.2.4 - Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 - Wild Salmon VEC
 - Section 7.9.2 - Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

DFO Science assessment of the risks associated with the proposed project identified a long list of significant uncertainties. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100% and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation (DFO 2016).

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and invasive species.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs)

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as

Commentaire [PE1]: Sebastien/Cyntia – please review

Commentaire [SD2]: Ok by me

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

salmon are a highly migratory species. Also, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc... will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the 1 year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty in this statement. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information..

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested..

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile (DFO 2016), although on p.17 it states that there will be 100% sterility.

Commentaire [PE3]: Sentence in 2016 doc we can use?

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would help place this in context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The recent status report on wild Atlantic Salmon in Norway, lists the two largest threats to wild salmon as being introgression between escaped farmed salmon with wild salmon, and sea lice (Norwegian Scientific Advisory Committee for Atlantic Salmon 2017). In view of this conclusion, it is assumed that triploids and not widely used in Norway.

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Page. 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach should begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)." The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reevaluated.*

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern." As stated previously, this may not apply to all BMAs.*

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater"*, however, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents can happen. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still thousands (hundreds of thousands in some years) of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not yet commonly used.

Page 45. It states that Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts would not be recommended in areas of low oxygen.

Commentaire [PE4]: Not in reference list – check with Brian

Is this the correct reference:

Pepper, V.A., Nicholls, T., Collier, C., Watkins, V., Barlow, E., and M.F. Tlustý. 2003. Quantitative performance measurement of alternative North American salmonid strains for Newfoundland aquaculture. Can. Tech. Rep. Fish. Aquat. Sci. 2502: vi + 53p.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 52. Regarding the statement that service vessels will assist with net changing, are nets routinely changed, and if so on what frequency or under what conditions, or is it just in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes..."* This would imply that all nets are replaced approximately every year. Additional detail is requested on net replacement and maintenance.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see newer initiatives being tried such as the use of cleaner fish for sea lice control, use of lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the lumpfish placed in cages may actively feed. Additional details are required on the usage of lumpfish (e.g. size and non-feeding lumpfish protocols, and transfer of pathogens/diseases from lumpfish to salmon).

The stock origin of the lumpfish (cleaner fish) is not clear. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in an areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure etc... is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how cross-contamination will be avoided as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination."* However, the Proponent will use routes crossing BMAs, as shown in Figure 2.53, thereby not mitigating risk of cross-contamination.

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is

Newfoundland and Labrador Region **Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.**

lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over 3 years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes...'* Please revisit and clarify for consistency.

Page92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue or not.

Page 99. The statement: *"In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality"* is unclear as only one intense winter could be problematic. A recent example is the superchill event in 2014, which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland Shelf) region?

Page 100. *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated." These data would be highly valuable to, and should be made available to industry regulators. Consultation and cooperation between the proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - 3; 2014 - 4; 2017 - 2; and 2018 - 2. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Commentaire [PE5]: Do we have a reference? AI – just add website hyperlink ask salmonids if I can't find

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location, however, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail and seems optimistic that there would be little to no problems.

Section 3.0 – Effects Assessment Methodology

Page 130. Project Area. Potential for runoff from the Marine Industrial Park due to a tank rupture was not included in the evaluation of the project area. This should be revisited.

Page 130. Study Area. It states that "The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA" and that "This is considered the maximum extent wherein there is potential for effects of the Project to occur..." Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this study area as salmon are a highly migratory species.

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s etc.) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 140. Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.

Page 141. *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate, however, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the study area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see: Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Mis en forme : Anglais (Canada)

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with 1 month of data (i.e. spring and neap cycle). In Newfoundland, ~~W~~^Wind forcing and the Labrador Current are variable on timescales of days to seasons (or more); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/ or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated and a discussion on how this uncertainty is being mitigated should be provided.

Page 145. Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, in this case the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*). There are other invasive species as well but these are the primary concern.

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (MacKenzie et al. 2016). There is no mention of how this will be prevented – this is particularly important if they do not want to be constantly cleaning their cages, the weight alone of vase tunicate is a significant problem. This is a maintenance issue but more importantly, they will be spreading this species around PB. It is important that Grieg have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that they cannot simply report - they will be responsible for the removal of the invasive tunicate. The proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if it was collected, but it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, they cannot simply spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation, so it is particularly important to ensure that no AIS make it to the sites. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in green crab density, this information is available from studies performed in Placentia Bay (see Matheson et al. 2016).

Information is presented in this section regarding eelgrass restoration only. Eelgrass is considered an ecologically significant species (see DFO. 2009; Rao et al. 2014), and information on existing eelgrass sites within the bay should be provided. In addition, and

Page 166. There is no mention of the threatened designation for lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is a concern.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. This is recommended in light of the lease sizes, the proximity of sites to MPAs, and the overall potential cumulative effect of deposition after stocking. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened". COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. The authors of the COSEWIC report also indicated that with respect to south Newfoundland, had the analysis extended back just one single year (i.e. over 16 years) South Newfoundland would have met the criteria to be designated as "Endangered". Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in NL. A retrospective analysis of salmon returns to Conne River for the years 1976-85 (10-year prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first four years of the fish counting fence operation (1986-89) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence. More discussion of historical and current studies should be provided.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Québec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al. 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs, with the exception of Northeast River, Placentia. The use of angling data, however, can be problematic. Stock assessments are not routinely carried out on rivers for which only recreational catch data are available. Reasons include: numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "is potentially quite risky."

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.

As noted in the EIS, superchill events have already occurred on the south coast of Newfoundland in 2014. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification." The time-series presented and used for this project are much too short to confidently support this statement. Also, the statement is not quantitative; the term "adequate" should be defined in this context.

Page 352. Algal Blooms. This section of document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the risk of negative environmental effect is not significant, yet the proponent has assigned a moderate level of confidence throughout these tables. A moderate level of confidence would indicate that the risk of each outcome cannot be in fact "not significant".

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapes on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. much too short) the estimated benthic loading of carbon provided in this section may be inaccurate not representative of what will eventually occur (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)." They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.*

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles." As stated above, recovery might not happen within timelines selected for fallowing by the proponent. However, at this stage only regulatory requirements through DFO Aquaculture Activities Regulations (AAR) will determine compliance.*

Page 369. Monitoring of the seabed using ROV, drop camera and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. Same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be deleted (place reference here).

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of all the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% fail-safe.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young

Commentaire [PE6]: Carole - Need reference to justify why delete sometimes.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys. DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: "...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon" is not substantiated. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 lumpfish cleaner fish) would not have a significant impact on wild salmon. On the contrary, an escape of 160,000 farmed salmon would likely have a significant effect on the wild salmon population (approximately 20,000 fish). Such a statement should have a higher level of confidence than that indicated in the EIS document (medium).

7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions,

Page 476. Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the wild salmon VEC were predicted to be not significant". The proponent outlined in detail the various mitigation measures that will be implemented, many of which are to be commended. Although numerous mitigation measures have been built into the proposed project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

~~Based on the current state of salmon populations on the South Coast, and in view of the Precautionary Approach, one could argue that there should be no increase in salmon aquaculture until there is a better understanding of why salmon populations in Bay d'Espoir and Fortune Bay are doing poorly by comparison with historic information.~~

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are statements that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

Page 480. It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, at best it would be low.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect 'alter genetic integrity....' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, then should also report that salmon that spend more than one year at sea are MSW.

Page 5. It states that "Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit." It would be useful if these other attributes were described. It also states that "since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon." There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc., which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL before the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past 2 consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that "the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages" and that this could affect migration patterns if wild salmon "choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey". This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river, however, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Commentaire [PE7]: Suggest now including Gamish 2017 returns. (which should be published in SAR this week).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again data are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by Grieg NL to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible'. Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked 4 times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat.

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."*

However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of 1 month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of 1 year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste"*, which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping ~~a few days~~ 20 hrs to few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tides ~~are is~~ a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here and where other such statements are made. For example the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* Where are the tidal analyses results?

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Figure 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Figure 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (page 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. ~~It is understood that to our knowledge,~~ Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term mean (vector-averaged) ~~mean~~ might be. The source of this information is unclear (e.g., reference, Mmooring name). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented ~~would be~~ are even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the study area would be beneficial and should be referenced and discussed.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Conclusions

Overall, the EIS documents are extensive and the topics considered within the relevant sections are generally appropriate. However, the level of certainty in the conclusions on risk characterization is insufficient and requires additional information and/or sampling.

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- Additional physical environmental data should be collected at each site. A longer time-series of ocean currents, in particular, should be collected as well as profiles of water salinity; the former due to its importance for dispersion modeling and monitoring, and the latter due to its importance on sea-lice life cycle.
- A lot of outdated material is cited whereas more recent material exists. Also, some inaccurate statements are found in the reports.

The mitigation measures proposed by the proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination, however, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the proponent on the effects;

- Assessment of the risks associated with the proposed project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. The data does not support this conclusion.

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to give statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each site) was used to make conclusions regarding suitable siting locations.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

The follow-up program proposed by the proponent;

- As the EEMP has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; additional sampling at each site and in areas between the BMAs to provide information on presence of and potential for organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Whether additional information is required from the proponent to complete the technical review.

- Please see the many comments provided throughout the review.

Contributors

Name	Affiliation
Erika Parrill	DFO Centre for Science Advice
James Meade	DFO Centre for Science Advice
Dale Richards	Meeting Chair
Roger Johnson	DFO Ecosystems Management
Chris Hendry	DFO Ecosystems Management
Ian Bradbury	DFO Science
Kate Dalley	DFO Science
Brian Dempson	DFO Science
Sebastien Donnet	DFO Science
Carole Grant	DFO Science
Bob Gregory	DFO Science
Dounia Hamoutene	DFO Science
Cynthia McKenzie	DFO Science
Andry Ratsimandresy	DFO Science

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

Approved by

B. R. McCallum
Regional Director Science, NL Region
Fisheries and Oceans Canada
June XX, 2018

Sources of information

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

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Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

This Report is Available from the

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Aussi disponible en français :

MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci. 2018/nnn.

Parrill, Erika

From: Parrill, Erika
Sent: Thursday, June 28, 2018 12:50 AM
To: McKenzie, Cynthia
Subject: RE: Updated Grieg EIS Doc

Thank you Cynthia!

D'oh! I'll make sure to note it's McKenzie and not MacKenzie for the future. Sorry about that.

-Erika

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill
Centre for Science Advice – NL Region

From: McKenzie, Cynthia
Sent: Wednesday, June 27, 2018 5:55 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>; Donnet, Sebastien G <Sebastien.Donnet@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>
Cc: Richards, Dale E <Dale.Richards2@dfo-mpo.gc.ca>
Subject: RE: Updated Grieg EIS Doc

I made just a few changes in track changes. Please see attached. Looks good to go to me.
Cynthia

From: Parrill, Erika
Sent: June-27-18 5:03 PM
To: Donnet, Sebastien G; Grant, Carole; McKenzie, Cynthia
Cc: Richards, Dale E
Subject: Updated Grieg EIS Doc

Hello – can you please review the comment bubbles with your names in the attached Grieg EIS Science Response and let me know any additional required edits?

Dale and I will need them by noon Thursday.

-Erika

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309

E-mail: brian.dempson@dfo-mpo.gc.ca

No information has been removed or severed from this page

Johnson, Roger

From: Richards, Dale E
Sent: Thursday, June 28, 2018 2:13 PM
To: Johnson, Roger
Cc: Kelly, Jason; Parrill, Erika
Subject: Grieg EIS - Science Response

Hi Roger,

Sorry I missed your call. Just wanted to give you a heads up that we are a little behind in completing the 'final - approved' version of the SRP document. We are on track to have a final version late tomorrow. The content has not changed from the information provided by Erika yesterday – just editorial and wordsmithing.

I am at my desk, if you need to discuss.

Dale

E. Dale Richards, B.Sc. Hons., M.Sc.

Centre for Science Advice / Centre des avis scientifiques

Newfoundland and Labrador Region / La Région de Terre-Neuve et du Labrador

Fisheries and Oceans Canada / Pêches et Océans Canada

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Visit the Canadian Science Advisory Secretariat of DFO / Visitez le Secrétariat Canadien de Consultation Scientifique du MPO

<http://www.dfo-mpo.gc.ca/csas-sccs/>

s.16(2)(c)

Richards, Dale E

De: Parrill, Erika
Envoyé: June-28-18 5:14 PM
À: Donnet, Sebastien G
Cc: Richards, Dale E
Objet: RE: Updated Grieg EIS Doc

Thanks Sebastien,

I've updated the SRR with your tracked changes.

Cheers,
Erika ☺

><(((o>...><(((o>...><(((o>...><(((o>...><(((o>...><(((o>

Erika Parrill
Centre for Science Advice – NL Region

From: Donnet, Sebastien G
Sent: Thursday, June 28, 2018 10:32 AM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>; Richards, Dale E <Dale.Richards2@dfo-mpo.gc.ca>
Subject: RE: Updated Grieg EIS Doc

Hi Erika, Dale,

please see attached. Please do not rephrase my comment of Page 363 any further, or let me know if you want to do so. As rephrased, it did not reflect my opinion nor the reality. Benthic deposition is one of the most important environmental effect of aquaculture activities and, as it stands, the proponent failed to assess this issue properly and as they are legally supposed to. This must be clearly stated from us with absolute no ambiguity about it.

cheers,

Sebastien

From: Parrill, Erika
Sent: 2018-June-27 17:03
To: Donnet, Sebastien G; Grant, Carole; McKenzie, Cynthia
Cc: Richards, Dale E
Subject: Updated Grieg EIS Doc

Hello – can you please review the comment bubbles with your names in the attached Grieg EIS Science Response and let me know any additional required edits?

Dale and I will need them by noon Thursday.

-Erika



Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309

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Kelly, Jason

From: Kelly, Jason
Sent: June-29-18 9:34 AM
To: Pike, Kelly J
Subject: Re: Briefing on Grieg EA

Yes

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Pike, Kelly J
Sent: Friday, June 29, 2018 9:27 AM
To: Kelly, Jason
Subject: FW: Briefing on Grieg EA

Ok with you?

From: Perry, Jacqueline
Sent: Friday, June 29, 2018 9:09 AM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>
Subject: RE: Briefing on Grieg EA

Ray,

Can we move this to 3:00 pm this afternoon. Jackie has a conflict at 1:00 pm.

Thanks,

Annette

-----Original Appointment-----

From: Finn, Ray
Sent: 2018-June-14 1:38 PM
To: Finn, Ray; Perry, Jacqueline; Kelly, Jason
Subject: Briefing on Grieg EA
When: 2018-June-29 1:00 PM-2:00 PM (UTC-03:30) Newfoundland.
Where: RDG's Office

Sorry Annette, updated it to 12:00 am – should be good now.

Moved to 1.00 pm as per RDG request.

Hendry, Christopher

From: Hendry, Christopher
Sent: June-29-18 9:46 AM
To: Ward, Chad
Subject: RE: Potential Placentia Bay Aquaculture development

Yes, three near Rushoon, three on the west side of Merasheen, three between Merasheen/Long Island, and two by Long Harbour.

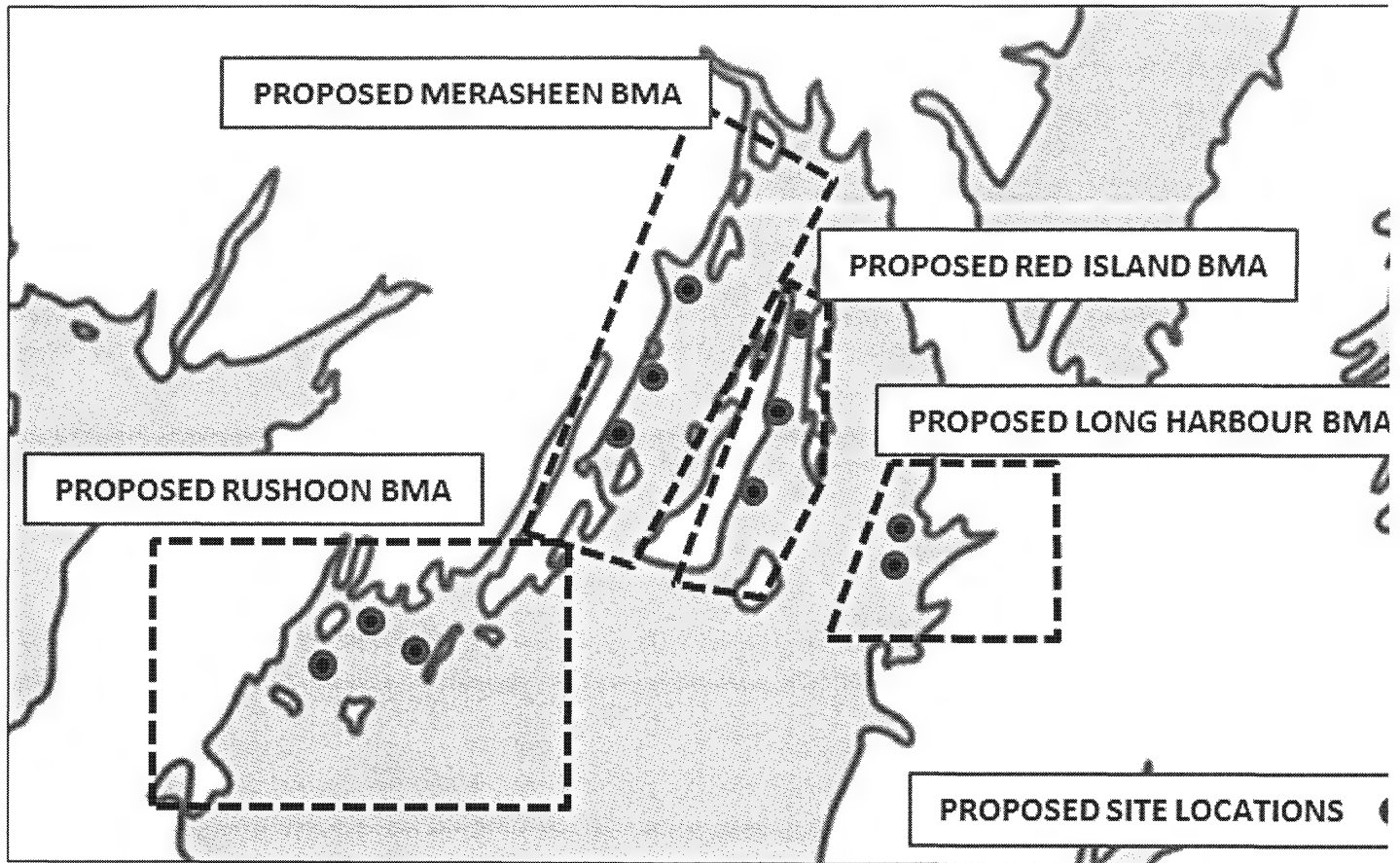
From: Ward, Chad
Sent: June-29-18 9:45 AM
To: Hendry, Christopher
Subject: RE: Potential Placentia Bay Aquaculture development

Chris , finding it difficult to pinpoint location but this looks like Meresheen island and surrounding area , Correct ?

Chad Ward
Area Chief, Conservation & Protection
Fisheries & Oceans Canada
North West Atlantic Fisheries Centre
80 East White Hills Road , P.O. Box 5667
St. John's , NL A1C 5X1
Tel : (709) 772 - 5857
Fax: (709) 772 - 0008

From: Hendry, Christopher
Sent: June-29-18 9:39 AM
To: Ward, Chad
Subject: RE: Potential Placentia Bay Aquaculture development

Should Grieg move forward with their plans, there will be four Bay Management Areas with $3+3+3+2=11$ sites. At any given time, seven sites would be in operation, with the remaining in fallow period (empty). This map shows where they will be:



I am unsure where Marystown ends and Placentia begins. Hope this helps.

From: Ward, Chad
Sent: June-29-18 9:21 AM
To: Hendry, Christopher
Subject: Potential Placentia Bay Aquaculture development

Good morning Chris ,

We are reviewing our footprint for our operations on the Avalon specifically Placentia satellite office. There has been a lot of talk and speculation that Placentia office and its staff will play a major role in future aquaculture monitoring in the area.

Do you foresee much Aquaculture activity in the head of Placentia bay that would not be monitored by Marystown detachment. What are Grieg's plans for development on the Placentia side of things . Would you see a need for increased officers to the area?

Any thoughts or comments would be appreciated.

Thanks

Chad

Chad Ward
Area Chief, Conservation & Protection
Fisheries & Oceans Canada

North West Atlantic Fisheries Centre
80 East White Hills Road , P.O. Box 5667
St. John's , NL A1C 5X1
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No information has been removed or severed from this page

Johnson, Roger

From: Johnson, Roger
Sent: Friday, June 29, 2018 11:56 AM
To: Kelly, Jason
Subject: EA

Just spoke with Susan Squires EA director with the province (she is handling the EA as Joanne Sweeny [REDACTED]).

Conversation went well and now she knows my name and role and the role of FPP.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

s.19(1)

Johnson, Roger

From: Johnson, Roger
Sent: Thursday, June 28, 2018 3:25 PM
To: Pilgrim, Bret
Subject: Fw: ASF review of EIS for the Placentia Bay Atlantic Salmon Aquaculture Project
Attachments: ASF_22Jun18 2.pdf; ASF concerns table.docx

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Hendry, Christopher <Christopher.Hendry@dfp-mpo.gc.ca>
Sent: Thursday, June 28, 2018 3:22 PM
To: Johnson, Roger
Subject: Fw: ASF review of EIS for the Placentia Bay Atlantic Salmon Aquaculture Project

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Thursday, June 28, 2018 15:11
To: Hanchar, Dorothea; Ficzer, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Squires, Susan
Subject: ASF review of EIS for the Placentia Bay Atlantic Salmon Aquaculture Project

Good Afternoon,

Please see the attached letter from the Atlantic Salmon Federation (ASF), bringing forward their comments and concerns regarding the Grieg EIS. I've attached an ASF concerns table for your review and comment, where it applies to your mandate. The ASF review is comprehensive, and may represent many public comments that are forthcoming with respect to the EIS review.

I offer the following guidance when reviewing the ASF letter:

- The Atlantic Salmon Federation (ASF) letter of June 22, 2018, includes specific references to the environmental assessment (EA) Registration review and EA Registration review memo (referred to as the Watton memo of July 22, 2016, and henceforth referred to as the Registration memo) for the Placentia Bay Atlantic Salmon Aquaculture Project (PBASAP).
- The PBASAP EIS guidelines bring forward the scientific and technical advice resulting from discussions between each EAC member and their respective departmental heads and senior level scientists and staff, and present a balanced review of that information by the EAC. Projects undergoing EA Registration review do not receive the high level of analysis, discussion and engagement of senior scientists and staff of interested federal and provincial government departments, nor the comprehensive and balanced review of the scientific and technical advice by a dedicated project EAC. The PBASAP Registration memo was considered in the development of the

PBASAP EIS guidelines, and pertinent information is included. References made to the Registration review memo by the ASF letter of June 22, 2018, will not be further evaluated.

- The EAC for the PBASAP will consider the EIS guidelines, the EIS document, public and government submissions received during the EIS review, and the current state of knowledge of interested government departments and agencies when providing a recommendation to the MAE minister regarding the acceptability of the EIS, in accordance with the provisions of the Environmental Protection Act, 2002, and the Environmental Assessment Regulations, 2003.

[REDACTED] returning on July 17, 2018. Please forward any project related questions, concerns and review comments to the EA Director, Dr. Susan Squires, during that time, by emailing susansquires@gov.nl.ca.

Regards,

Joanne

Joanne
709.729.2822

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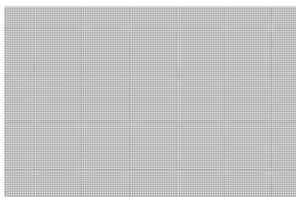
From: [REDACTED]
Sent: Friday, June 22, 2018 11:18 AM
To: EA Project Comments
Subject: ASF submission on Placentia Bay aquaculture EIS
Attachments: ASF comments on Placentia Bay aquaculture EIS (reg. 1834).pdf

Dear Ms. Sweeney,

Attached, please find a submission by the Atlantic Salmon Federation regarding the Placentia Bay aquaculture project EIS.

Acknowledgment of receipt of this submission at your convenience would be appreciated.

Regards,



Atlantic Salmon Federation (ASF)



Phone: [REDACTED]

Mobile: [REDACTED]

s.19(1)

Please visit ASF's website www.asf.ca!



June 22, 2018

Joanne Sweeney, Project EA Chair
Department of Municipal Affairs and Environment
Environmental Assessment Division
West Block, Confederation Building
PO Box 8700
St. John's NL A1B 4J6

RE: Placentia Bay Atlantic Salmon Aquaculture Project (#1834)

Dear Ms. Sweeney and Members of the Environmental Assessment Committee:

The Atlantic Salmon Federation (ASF) has reviewed the Environmental Impact Statement (EIS) submitted by Greig NL for the Placentia Bay Aquaculture Project. We are profoundly disappointed by the proponent's inadequate efforts to understand the local environment, predict and evaluate impacts, and monitor outcomes, particularly around issues related to wild Atlantic salmon. We conclude that the EIS does not address the concerns raised by the public, the issues identified by the Environmental Assessment (EA) Division during the screening review, the issues upon which the Supreme Court of Newfoundland and Labrador based its decision to order an EIS for the project, or the EIS guidelines issued by the EA Division. Therefore, we conclude that the EIS and component studies are deficient. Substantial additional work must be done by the proponent to meet the standards clearly defined in the guidelines.

Our review has identified numerous issues and deficiencies across four main areas: 1) Lack of original data collection to augment the information presented in the project registration document; 2) Evaluation of potential impacts is not rigorous, balanced, reasonable, or transparent, resulting in conclusions that are not justified; 3) Lack of meaningful detail about the proponent's approach to follow-up monitoring programs; and 4) Superficial evaluation of project alternatives with unjustified conclusions. We discuss these issues in detail in the sections below with particular attention to wild Atlantic salmon; however, we note that many of these issues also apply to other Valued Ecosystem Components (VECs).

1. Lack of original data collection to augment the information presented in the project registration document

The EA Division conducted a thorough review of the information provided by the proponent in their registration document (filed Feb. 19, 2016) as well as the information provided by members of the public and other government agencies including Fisheries and Oceans Canada (DFO), the Canadian Science Advisory Secretariat (CSAS), and the NL Wildlife Division as part of the screening review process. The EA Division's analysis of that information was presented in a detailed memorandum by Mr. Eric Watton to the Minister (the Watton Memo) on July 22, 2016. The memo clearly demonstrates that the EA Division recognized that understanding the present ecosystem and population ecology of wild salmon is critical for predicting, assessing,

mitigating, and monitoring any project effects on wild Atlantic salmon. However, throughout that document, it was repeatedly stated that the necessary data on wild Atlantic salmon does not exist (see for example p. 15). One of the key recommendations arising from the analysis was that an EIS be ordered to (among other things) “require a study of baseline ecosystem and population ecology on the wild salmon of Placentia Bay” and “investigate and provide more information on the uncertainties, knowledge gaps, and recommendations provided in the CSAS report” (Watton Memo, pg. 48). The Watton Memo and the CSAS report (Science Response 2016/034) both identified several key areas where more data are needed, including:

- abundance of threatened southern Newfoundland salmon in Placentia Bay;
- migratory patterns and residency time of wild salmon in Placentia Bay;
- genetic structure of wild salmon in Placentia Bay;
- escaped triploid salmon dispersal, survival, feeding, movements into rivers, and interactions with wild Atlantic salmon;
- fitness differences between wild and escaped farmed salmon;
- the extent of competitive interactions between wild and escaped farmed salmon and the effects of these interactions on the survival of wild salmon and on local population demographics;
- statistical data on the effectiveness of the triploidy induction process;
- and potential reproductive success of failed triploids.

The need for more data on wild Atlantic salmon and other VEC’s was clearly recognized by the EA committee when developing the EIS guidelines. For example, the guidelines require the proponent to conduct a component study on salmon to include “characterization of the current distribution, abundance, genetic population structure, morphology, health and fitness, and migratory patterns of wild Atlantic salmon in the waters of Placentia Bay” (EIS guidelines p. 10). Furthermore, the EIS guidelines clearly state that “the rationale for a component study is based on the need to obtain additional data to determine the potential for significant effects on a VEC due to the proposed undertaking, and to provide the necessary baseline information for monitoring programs” (EIS guidelines p. 22) and that “information and data generated shall be sufficient to adequately predict the effects of the undertaking on the VEC” (EIS guidelines p. 23).

In requesting information on things like abundance, genetics, and migratory patterns of wild salmon in Placentia Bay, the EA committee was clearly aware that such information does not currently exist. Indeed, the key reason why the EA Division originally recommended an EIS rather than an Environmental Preview Report was “because the information for areas of further study (e.g., baseline wild salmon data and other recommendations in the CSAS report) are not readily available” (Watton Memo p. 48). That, combined with the above cited instructions in the EIS guidelines, demonstrates a clear requirement that the EIS entails the collection of original data to fill the identified data gaps. This was not done.

The two key natural environment VEC component studies submitted by the proponent (Wild Atlantic Salmon and Fish and Fish Habitat) are “desktop literature reviews” with no attempt made to collect original data. Consequently, the data gaps identified in the screening review and CSAS report have not been filled, the evaluation of potential impacts on wild salmon is based on incomplete information and faulty assumptions (see section 2 below), baseline data are not available from which to develop monitoring programs (see section 3 below), and the requirements and objectives of the EIS guidelines have not been met.

It is important to recognize that the proponent has been allotted a significant amount of time to complete the EIS. Of the 3 years plus 2 optional one-year extensions available, the proponent used 2 months and 10 days to complete the EIS. While we recognize that some important information cannot be collected prior to beginning the phased production plan (e.g., behaviour of escaped fish and their interactions with wild salmon), much of the information vital to predicting, mitigating, and monitoring the impacts of the project on wild salmon can be collected within the EIS timeframe. We discuss a number of key examples below:

- a) Migration patterns and habitat use of wild salmon within Placentia Bay are key to understanding the potential impacts from the project and designing appropriate monitoring programs. As noted by the proponent, the closer migrating juvenile and adult salmon approach the cages, the more likely they are to pick up parasites and diseases. Timing of migration past cages is also important because outbreaks of diseases and parasites are more likely to occur at particular times of the year. Most of the proposed cage locations are in prospective salmon migratory routes, but as the proponent points out multiple times in the EIS, “Atlantic salmon migratory corridors in Placentia Bay have not been identified in the literature” (Wild Salmon Component Study, p4). Furthermore, the proponent continues to identify this data gap as limiting their ability to accurately predict impacts: “Key gaps include: (1) data related to the migration routes of wild salmon, both smolts and returning adults, within Placentia Bay; and (2) data related to time spent by and activities of wild salmon within Placentia Bay.” (EIS p. 344).

Surprisingly, the proponent goes on to note that “a study planned for Placentia Bay this year will hopefully provide some information on migratory corridors in the bay” but no further details are provided. This raises serious questions about the proponent’s commitment to conducting a thorough and robust EIS. If this study is imminent and will provide the necessary data, why has the EIS been submitted before it has been completed? This is highly inappropriate given that the EIS is predicated on the “need to obtain additional data to determine the potential for significant effects on a VEC” and because the proponent has been instructed that “information and data generated shall be sufficient to adequately predict the effects of the undertaking.” Once the EIS has been approved and construction started it will be too late. These data are needed now, at the assessment stage. A study to provide the necessary data is planned for the near future, therefore the proponent should be required to ensure that these data are appropriately incorporated into the EIS. Data and knowledge gathered could require substantial changes to siting and mitigation measures and could materially change the project that is described in the EIS. Therefore, doing those studies after the EIS is completed is of little value.

- b) Abundance of threatened wild salmon in Placentia Bay is a key piece of information necessary for evaluating and assessing impacts: populations with higher abundance will be more resilient to impacts, and outcomes will ultimately be measured in terms of changes in abundance on a population-by-population basis. The EA Division concluded that there is “insufficient information available to make an accurate assessment of how many threatened Southern NL wild salmon there are in Placentia Bay” (Watton Memo p. 17). The EA Division also concluded that “angling returns are not reliable and do not reflect actual population size data” (Watton Memo p. 18). Contrary to this clear and direct statement, the proponent continues to rely only on angling license returns for estimating abundance: “Recreational salmon fishing data for most rivers in Placentia Bay are probably the best available indicator of salmon abundance within the study area” (Wild Salmon

Component Study p. 7). The proponent then goes on to present a table of catch statistics for individual rivers from 2012-2016, but provides no actual estimates of population abundance in these rivers. Clearly, the information provided is not sufficient to fill the data gaps identified in the screening review and **does not meet the criteria described in the EIS guidelines.**

Collection of abundance data for the key rivers in Placentia Bay is not difficult and could easily be done within the time allocated for EIS preparation. For example, juvenile abundance can be estimated using electrofishing surveys; smolt runs can be enumerated/estimated using counting fences or rotary screw traps; adult returns can be enumerated using counting fences or snorkel surveys. All of these methods are currently used in Newfoundland and/or the Maritimes and could easily be applied to rivers in Placentia Bay. The proponent could easily design a study to estimate abundance of wild salmon in Placentia Bay and use this information to predict and evaluate impacts and design appropriate monitoring programs within the allotted timeframe.

- c) Data on the genetic structure of wild salmon populations is vital for predicting and monitoring direct and indirect genetic impacts from the proposal. Due to lack of data, the CSAS report recommended that the proponent conduct baseline studies to characterize the genetic structure of existing populations in Placentia Bay. This was reflected in the EIS guidelines (p. 19). The proponent's response to this is one paragraph pointing the reader to four references which have described the genetic structure of the South Newfoundland Atlantic Salmon Population (Wild Salmon Component Study p. 5). Little detail is provided here, particularly for Placentia Bay populations which are a subset of the South Newfoundland population. This information is clearly not adequate for predicting or monitoring impacts and therefore **does not meet the criteria outlined in the EIS guidelines.**

Characterizing the genetic structure of Placentia Bay salmon populations would not be difficult, it simply requires collecting appropriate samples from Placentia Bay rivers and having them analyzed by an expert in population genetics. There is no reason why this could not be done and the results incorporated into the EIS within the allotted timeframe.

An EIS is only as good as the data upon which it is constructed. One of the principle reasons why the EA Division recommended the EIS to the Minister and why the Newfoundland and Labrador Supreme Court ordered the EIS was to fill the data gaps (particularly those regarding wild salmon) identified in the screening and CSAS reviews. The EIS guidelines issued to the proponent clearly require the collection of original data when existing information is not sufficient for predicting, evaluating, mitigating, and monitoring impacts. Likewise, the time allotted for the proponent to collect the necessary data is sufficient to facilitate the design and implementation of rigorous and robust studies. The only conclusion that can be reached is that the proponent has chosen to ignore the EIS guidelines. This is unacceptable. The component studies provide little information that was not already considered in the screening review and therefore leave most of the data gaps unfilled. Consequently, the resulting evaluation of impacts and mitigation strategies are lacking depth and rigour and the conclusions cannot be justified.

Above, we have discussed three key areas relevant to wild salmon where original data collection is required and where the necessary studies can be conducted within the required EIS timeframe. There are likely data gaps concerning other VECs. We recommend that the component studies be judged as

“deficient” and sent back to the proponent with specific instructions to follow the EIS guidelines as previously outlined.

2. Evaluation of potential impacts is not rigorous, reasonable, balanced, or transparent, resulting in conclusions that are not justified

Prediction and evaluation of potential environmental effects is the core of any EIS. This information is used to determine and evaluate proposed mitigation and monitoring strategies and, ultimately, the overall acceptability of the project. If effects prediction is not done well, the EIS is ultimately of little value or utility. This importance is reflected in the extensive instructions provided to the proponent in the EIS guidelines which include requirements that predicted effects be defined quantitatively where possible, application of the precautionary principle, and the rationale be explicit and presented in terms of the ecological context and level of knowledge.

As discussed extensively above, the EIS is entirely deficient in terms of information regarding ecosystem and population ecology of wild salmon needed to make meaningful predictions of effects or to design an appropriate mitigation and monitoring program. In cases where vital information is lacking, the precautionary approach dictates that potential effects are evaluated under the assumption that potentially harmful interactions will occur (i.e., that interbreeding between wild and farmed salmon will occur, that migrating salmon will move past, [or be attracted to] sea cages, that disease and parasite transfer will occur, that escaped farmed salmon will interact ecologically with wild salmon). While the lack of information is acknowledged to a certain extent by the proponent, the significance of the missing information is not acknowledged. Most concerning is that the precautionary approach is not applied in these situations. When information is lacking, the proponent assumes that this information would demonstrate no significant negative interactions between wild and farmed salmon with little, (or at times incorrect) rationale for making such assumptions. These assumptions then form the basis of their conclusions. This is highly inappropriate and not at all consistent with the EIS guidelines. The proponent should not be permitted to avoid collecting the data necessary to predict and evaluate effects and then assume that these data would support their position (i.e., no impacts). The lack of data accentuates the need to apply the precautionary approach. The proponent needs to collect the required data; where that is not possible the assessment should be conducted under the assumption that harmful interactions between wild and farmed salmon will occur.

In addition to the lack of data collection per the EIS guidelines and inappropriate assumptions, the evaluation of impacts section in the EIS is neither rigorous nor transparent. In many cases it is not clear how the ratings (e.g., significant vs. non-significant; level of confidence) are arrived at. When a rationale is provided, it is often not well described or is based on inadequate data or faulty assumptions; in other words, it is not scientific. In general, the assessment of effects appears to be highly subjective with no evidence that the same conclusions would be reached if the analysis was repeated by someone with a different perspective. The conclusions regarding wild salmon, (i.e., that none of the identified interactions or impacts will be significant) are not justified by the analysis. Below we provide a critique of some of the key potential effects that have been inadequately assessed and predicted.

- a) Genetic pollution resulting from interbreeding between wild and escaped farmed salmon has been identified as a key concern. The proponent claims that there is no possibility of genetic interaction between wild and escaped farmed salmon because the farmed salmon will be 100% sterile triploid

fish. However, as noted in the CSAS report, the current scientific literature indicates a failure rate of up to 2% in the triploidy induction process, meaning 2% of fish could be fertile. If 2% of the fish used in this project are indeed capable of interbreeding with wild fish, the risk profile of the project changes significantly. A 2% triploidy failure rate would result in 140,000 fertile farmed salmon of European origin stocked into sea cages each year at peak production. The proponent counters this by claiming that their egg supplier has developed new methods of triploidy induction/verification that result in fish that are 100% sterile and female. However, no evidence to support this claim has been presented, and few details about the actual triploidy induction process have been provided (the egg supplier claimed proprietary rights and declined to provide details). A search of the egg supplier's website and of the scientific literature revealed no proof of this claim.

The lack of quantitative data on the effectiveness of the triploidy induction process leads the proponent to conclude that the impacts of farmed salmon escapes on wild salmon will be non-significant "*assuming* the triploid all-female egg induction process is 100% effective" [emphasis added] (EIS p. 439). As noted above, this assumption has not been justified and is not consistent with the current scientific literature. Consequently, the conclusion of non-significant effects is not justified by the information provided.

Obtaining quantitative scientific data to validate the assumption of 100% sterile/female should not be difficult. Surely the egg supplier has quantitative data on the actual induction failure rate and the probability that their two-stage verification process will detect failures. Likewise, it should not be difficult for the proponent to verify that the eggs obtained from the supplier are 100% triploid and female. This could be tested by obtaining shipments of eggs from random batches and having the triploidy/female status of each egg independently tested. If a sufficiently large random sample reveals a rate of 100% triploidy/female, then the assumption would be justified. If the testing reveals that some small percentage of the eggs received from the supplier are not triploid and/or female, then the observed percentage should be used in the prediction and evaluation of negative effects. Given the public and scientific concern about the potential for genetic pollution and the likely outcomes for wild salmon if such interbreeding was to occur, it is difficult to understand why the proponent has not provided robust quantitative data to justify the claim of 100% triploidy/female.

- b) Further to the points above, we also note that the EIS guidelines state that "mitigation failure should be discussed with respect to risk and severity of consequences" (p.27). However, we are unable to find a discussion of the risks and consequences should this key mitigation strategy fail to produce 100% triploid all-female stock. Given that the consequences of interbreeding with wild salmon would likely be severe, this is a glaring omission and therefore **does not meet the criteria outlined in the EIS guidelines**.
- c) Genetic pollution resulting from interbreeding between wild and escaped farmed lumpfish has been identified as a concern by the EA committee. The proponent states that "the potential effect of an escape of juvenile lumpfish is not of concern with respect to genetic integrity of and ecological interaction with wild lumpfish given their sexual maturity status and their broodstock is from Newfoundland waters" (EIS p. 440) and therefore concludes that effects of escaped lumpfish on wild lumpfish will be non-significant. This statement and conclusion are based on incorrect

assumptions not consistent with basic biology and the wealth of scientific information about domestication of wild animals. The lumpfish will be juveniles when they escape, but if they survive long enough in the wild they will eventually become sexually mature and breed with wild lumpfish. Given that the proponent has presented no evidence that escaped lumpfish will not survive in the wild long enough to become mature, it is not acceptable to assume that this will not happen. Likewise, the claim that there will be no effects because the farmed lumpfish come from local broodstock is not consistent with the current literature demonstrating that even a single generation of domestication in fish can alter the expression of hundreds of genes (e.g., Christie et al. 2016). Again, the proponents have presented no information refuting the current literature and supporting their assumption that there will be no genetic differences between wild lumpfish and the domesticated strain(s) they plan to use. In the absence of such information, the precautionary approach dictates that one assume there are differences that could result in impacts and conduct the effects prediction accordingly. Given these issues, there is no basis for the conclusion that genetic impacts on wild lumpfish will be non-significant. Considering the status of lumpfish in Placentia Bay and the known impacts on wild animal populations of interbreeding with domestic animals, this component of the analysis needs significant revision.

- d) The spread of parasites (primarily sea lice) from sea cages and the resulting impacts on wild salmon is a major concern. The EIS guidelines require the proponent to provide “a literature review of the effects of disease and parasites from farmed salmon on wild Atlantic salmon” and to conduct a comprehensive analysis of the potential effects of “the transfer of disease and parasites between farmed salmon and wild Atlantic salmon and between farmed salmon and other fish.” **Neither of these requirements of the EIS Guidelines has been met.**

While the Wild Atlantic Salmon Component Study contains a section titled “Sea Lice”, most of it deals with sea lice control measures. The very brief section that does deal with the impacts of lice transfer from farmed salmon to wild salmon does little more than acknowledge that lice can be transferred from sea cages to wild salmon – there is no review of the extensive literature demonstrating the significant impacts of sea lice transfer on wild salmon (see for example: ICES 2016; Shepard and Gargan 2017). Much important information is missing from this very superficial review including discussion of the magnitude of impacts from sea lice infestations that spread from fish farms to wild salmon, and the correlation between lice levels in cages and impacts on wild salmon. Important questions remain unanswered: At what level do lice infections begin to cause problems for individual wild salmon smolts and adults? To what levels should sea lice in cages be controlled in order to avoid impacting wild salmon? What operational and monitoring practices are most effective for controlling sea lice at levels to avoid impacting wild salmon? Without answers to these questions, many of which exist in studies that have not been reviewed, the literature review provided by the proponent does not provide sufficient information to support the evaluation of potential effects from the project or the proposed mitigation measures.

The sea lice literature review includes a discussion of the use of lumpfish as a lice control method in sea cages. However, the information contained in this review is also inadequate to understand the method’s effectiveness and therefore its potential to mitigate the impacts of sea lice on wild salmon. The review provides some evidence that cleaner fish can reduce lice infestations in cages, however the question of whether this reduction is sufficient to mitigate the impacts of the lice on

wild salmon is not addressed. An important point here is that reducing sea lice infestations in sea cages to levels adequate for the production of farmed salmon does not necessarily mitigate the impacts of sea lice on wild salmon. To understand whether lice control measures work to mitigate impacts on wild salmon, one must also have knowledge of the infestation levels above which wild salmon begin to become impacted and the levels at which lice will be limited to in the cages. **That information has not been provided by the proponent.**

As noted previously, the proponent's analysis of the potential effects of the transfer of disease and parasites between farmed salmon and wild Atlantic salmon is highly inadequate for the following reasons:

- i. The potential effects of lice impacts is buried within effects assessments surrounding feeding of farmed salmon (EIS p. 378) and not directly assessed. Given the scientific and public concern about the potential impacts of sea lice transfer on wild salmon, this is highly inappropriate. Sea lice impacts need to be assessed as a stand-alone item (probably works best under "Presence of Farmed Salmon" [p. 379]).
- ii. The use of cleaner fish is inappropriately viewed as a mitigation measure for the control of sea lice on wild Atlantic salmon. Cleaner fish, and other lice control methods, are used primarily as a mechanism to keep sea lice at levels adequate for the profitable production of farmed salmon. Indeed, all lice control methods discussed by the proponent are aimed at fish production, not mitigation of environmental impacts. While there is some literature cited by the proponent that suggests a positive relationship between lice levels and likelihood of impacts on wild salmon, no quantitative information has been provided to indicate at what level lice must be limited to in order to prevent impacts on wild salmon. We note that significant information about the direct effects of sea lice on wild salmon is available (e.g., ICES 2016), and that other salmon farming jurisdictions have used such information to regulate sea lice levels within cages for the purpose of protecting wild salmonids (e.g., Faroe Islands http://www.nasco.int/pdf/2018%20papers/APRs/CNL_18_21_APR_Faroe%20Islands.pdf). Given the paucity of information provided by the proponent, there is no way to verify that the use of cleaner fish and other lice control methods will be effective for mitigating sea lice impacts on wild salmon.
- iii. The use of cleaner fish is incorrectly viewed as having a positive impact on wild salmon (EIS p. 380). A positive impact on wild salmon would be one that increases their abundance, productivity, or resilience (or some other measure of wild salmon health). The use of cleaner fish may have a positive impact on sea lice levels which in turn may reduce the likelihood of impacts on wild salmon (although as noted above, the proponent has not adequately demonstrated that relationship). At best, the use of cleaner fish can be considered a potential harm-reduction measure, but in no way can it be considered to have a positive impact on wild salmon. This absurd argument demonstrates the lack of knowledge, rigour, and scientific integrity with which this effects assessment has been conducted.
- iv. Inadequate data has been provided to understand how wild salmon smolts and adults will interact with sea cages and sea lice dispersed from cages. Wild salmon will be more likely to be

infected by parasites and diseases the closer they approach the cage sites (or currents carrying sea lice from cages) and the longer they remain in the vicinity. However, as noted in the previous section, no information about wild salmon migratory patterns or residence time within Placentia Bay has been provided, and the significance of this missing information is not recognized by the proponent and incorporated into the analysis. Instead, unfounded assumptions about residence times and migratory routes are used to downplay the potential for wild salmon to pick up parasites and disease from sea cages (e.g., EIS pp. 440; 447).

- v. The effects of sea lice on wild salmon under the scenario of mitigation failure have not been assessed. As noted previously, the EIS indicates that “mitigation failure should be discussed with respect to risk and severity of consequences” (EIS Guidelines p. 27). The proponent does note that sea lice levels may increase despite the use of cleaner fish and other methods (EIS p. 100). Indeed, uncontrolled sea lice outbreaks are common in the salmon aquaculture industry, and it is under these conditions that most damage is likely to be done to wild salmon populations (e.g., Shepard and Gargan 2017). The proponent describes some of the additional measures that might be used if outbreaks occur (EIS p. 100), however, it is not clear at what levels of infestation these alternative options will be implemented nor how effective they will be at preventing infection in wild fish during an active outbreak. Without incorporating situations of sea lice outbreaks into the effects prediction and evaluation, conclusions about the potential residual impacts on wild salmon populations are meaningless.
 - vi. No meaningful analysis of available information from the current industry on the south coast of Newfoundland with regards to sea lice has been conducted. Despite acknowledging that the current provincial Code of Containment requires sea lice counts as requested from the provincial veterinarian, indicating the presence of such information from current industry sites, the proponent provides no information about the current situation with regard to sea lice presence and prevalence in the existing industry. Without this quantitative information, it is not possible to understand the extent of the potential problem or to evaluate the veracity or effectiveness of the proponent’s proposed lice control techniques.
- e) Impacts of the use of pesticides and antibiotics on the marine environment are a public and scientific concern, and the proponent was specifically directed to evaluate the potential impacts of these and other deposits on the environment (EIS guidelines, p.24). Although the proponent provides a cursory evaluation, this has not been adequately addressed in the EIS. Instead, the proponent makes a number of unsupported and contradictory claims in order to avoid a detailed discussion about the potential impacts of pesticides and antibiotics on the Placentia Bay environment. For example, the proponent claims they will use no pesticides (Wild Salmon Component Study p. 30), but then contradict themselves when they acknowledge the use of agents like emamectin benzoate as a last resort (Wild Salmon Component Study p. 51). We note that Fisheries and Oceans Canada recently released information demonstrating extensive use of pesticides in the existing Newfoundland and Labrador industry (<https://open.canada.ca/data/en/dataset/288b6dc4-16dc-43cc-80a4-2a45b1f93383>). In light of this information, the lack of contextual information about the prevalence of sea lice at existing sea cage sites in NL (see section vi. above), and the lack of evidence that proposed mitigation measures (cleaner fish) are adequate to control seal lice, the statement that pesticides will not be used is

unreasonable and contradictory. We note again that the EIS guidelines state “mitigation failure should be discussed with respect to risk and severity of consequences” (EIS Guidelines p. 27). Mitigation failure for sea lice control means a lice outbreak, and lice outbreaks likely mean extensive use of pesticides. Failure to evaluate the potential impacts of pesticide use under the scenario of mitigation failure is **not consistent with the guidelines provided to the proponent**.

Likewise, data collected by Fisheries and Oceans Canada shows widespread use of antibiotics in the existing industry, indicating persistent and serious problems with disease (<https://open.canada.ca/data/en/dataset/288b6dc4-16dc-43cc-80a4-2a45b1f93383>). The proponent claims on its website that no antibiotics will be used (<https://www.griegnl.com/faq/>), however in the EIS the proponent admits antibiotics will be used as required (Wild Salmon Component Study p. 50). Given the data released by DFO, it is reasonable to conclude that “as required” is likely to be “extensive”. The proponent concludes that there will be no significant impacts of antibiotics despite no detailed discussion or evidence being presented about the effect of antibiotic use on the receiving environment, wild species, or human health. Given the concerns about excessive use of antibiotics in the aquaculture industry and the resulting impacts on the humans and the environment, this is a glaring omission.

- f) Ecological interactions (e.g., competition for food and space) are a concern when large numbers of fish escape from sea cages. The proponent claims that “escaped salmon are not expected to interact ecologically with wild salmon” (EIS pp. 440, 447). However, very little rationale is provided for that statement except to say “competition for resources is likely to be minimal given that migrating wild salmon are focused on either getting to the open ocean on the offshore to feed or returning to natal rivers to spawn” and “the potential for ecological interaction [...] is limited assuming the wild salmon spend minimal time in the Placentia Bay marine environment” (EIS p. 440). No information has been presented to support these statements and assumptions.

As has already been noted, lack of information on wild salmon migrations through and use of Placentia Bay has been identified as problematic by CSAS, the EA Division, and the proponent, but despite this, the proponent has made no attempt to collect the relevant data in support of the EIS and as outlined in the EIS Guidelines. Furthermore, the CSAS review identified other relevant data gaps: 1) uncertainty about the extent of competitive interaction between farmed and wild salmon, their effects on survival of wild fish, and the impact of local population demographics on interaction outcomes; and 2) uncertainty regarding the fate of escaped farm-origin fish in the marine and freshwater environment including post-escape dispersal patterns, survival, feeding, and their movements into wild salmon rivers.

Given these data gaps and uncertainties, the reality is that the proponent has no way of knowing what the interactions between escaped farm salmon and wild salmon will be, or what outcomes might result. Rather than collect relevant data and conduct a thorough and robust analysis of potential interactions and effects, they have ignored uncertainties and relied on baseless assumptions to reach unsupported conclusions. Again, it is necessary to point out that where data are lacking, the precautionary principle dictates that the analysis be conducted under the assumption that harmful interactions will occur; to do otherwise would be irresponsible and not consistent with the principles of environmental assessment.

It is worth noting that the emergency scenario (2,000,000 farmed salmon accidentally released in early summer) would release 400 times the estimated Placentia Bay wild salmon population at a time when both smolt and adult wild salmon would be present in the bay. The proponent's conclusion that there will be no significant impacts from such a large-scale spill is based on an overly simplistic analysis with no supporting data. This will not satisfy the public and scientific concerns that have been repeatedly expressed about the possibility of a catastrophic spill.

In summary, the effects assessment portion of the EIS is very poorly conducted. The analyses suffer particularly from lack of relevant data, frequent reliance on unsupported or faulty assumptions, lack of transparency and rigour, simplistic arguments, and a general failure to apply the precautionary principle. In the paragraphs above we have outlined a few key examples where these issues exist; however, we note that one or more of these issues apply to most of the effects assessed in the EIS. Given these weaknesses, it is not surprising that no significant impacts from this project have been identified despite the overwhelming scientific evidence demonstrating significant risks and impacts everywhere else in the world that this industry operates. The analyses and conclusions presented in the EIS are not likely to answer the concerns of the public, the scientific community, or the courts.

3. Lack of meaningful detail about the proponent's approach to follow-up monitoring programs

Follow-up monitoring program design is an integral part of an environmental assessment. A high-quality monitoring program is necessary to ensure mitigation strategies are working and that there are no unexpected or unanticipated impacts from the project. A good monitoring program is also essential for assuring the public that their concerns are being taken seriously and that any unanticipated effects from the project will be promptly detected and remedied. Within that context, the EIS guidelines instructed the proponent to describe their proposed approach to environmental and socio-economic monitoring in order to "verify the accuracy of the predictions made in the assessment of the effects as well as the effectiveness of mitigation measures" (EIS Guidelines p. 29). The guidelines require the proponent to describe their approach for monitoring in terms of the objectives, sampling design, methodology, frequency, duration, reporting, procedures to assess effectiveness, recovery programs (where necessary), and a communication plan to describe the results to interested parties (EIS Guidelines p. 30). The proponent was also directed to consider the development of monitoring plans to address a range of issues, including direct and indirect genetic and ecological interactions between escaped farmed salmon and wild Atlantic salmon.

It is recognized that the EIS guidelines permit the proponent to finalize the actual Environmental Effects Monitoring Program (EEMP) subsequent to EIS completion (but prior to construction). However, the EIS does require the proponent to describe their proposed approach for monitoring according to the criteria noted above and explained fully on pages 29 and 30 of the EIS guidelines. Rather than provide the required details on their proposed approach, the proponent has simply stated that "the EEMP will clearly outline the objectives of monitoring, methodology, criteria for adaptive management, identification of procedures to test the efficacy of mitigation measures and follow-up monitoring, and a communication plan for disseminating findings" (EIS p. 475). This is not acceptable. The purpose of requiring the proponent to fully describe their proposed approach to monitoring in the EIS is to give the environmental assessment committee and members of the public the opportunity to understand and comment on the proposed approach before the details of the EEMP are finalized. By not including the requested details, the proponent is depriving the EA committee and the public of this important opportunity.

We note that the proponent has provided one paragraph briefly describing their approach to monitoring movement of farmed salmon into scheduled salmon rivers in the event of an accidental escape (EIS p. 476). This plan for monitoring the impacts of the project on wild Atlantic salmon is wholly inadequate and demonstrates a disturbing lack of concern about the potential impacts on wild salmon and a lack of commitment to transparency and environmental protection in general. Below, we outline a number of reasons why the proposed monitoring plan for wild Atlantic salmon is deficient.

- a) It is not sufficient to monitor movement of escaped farmed salmon into rivers only after reportable escape events. The proponent acknowledges that small-scale losses will likely occur, and that such ongoing losses could be more problematic than infrequent major escapes (EIS p. 434). We also note that escapes of less than 100 individuals are not reportable events in Newfoundland, (assuming they are even noticed). Within that context, it is important to have ongoing monitoring of the movements of escaped farmed salmon into the rivers of Placentia Bay.
- b) Likewise, it is also important to understand and monitor the migratory and residence patterns of wild salmon in Placentia Bay both before and after production. As Goodbrand et al. (2013) demonstrated in a study on the NL south coast, the presence of sea cages containing farmed salmon can affect the distribution and abundance of wild fish across large spatial scales. That is, salmon farms can act as “bird feeders”, drawing in and concentrating wild fish thereby potentially exposing them to parasites, diseases, and predators as well as disrupting normal migratory patterns.
- c) We reiterate the stated purpose of the EEMP “to verify the accuracy of the predictions made in the assessment of the effects as well as the effectiveness of the mitigation measures” (EIS Guidelines p. 29). Clearly, there is an expectation that monitoring programs be designed for areas of concern and for any mitigation procedures that have been proposed. This has not been done. Within that context, there are a number of other areas where monitoring plans are needed:
 - i. Disease and parasite transfer from farmed to wild salmon are key public and scientific concerns, and the proponent has proposed several actions to mitigate these impacts. Furthermore, the proponent’s effects assessment predicts that after mitigation there will be no significant impacts on wild Atlantic salmon from either parasites or diseases. Consequently, it is clear that the EIS guidelines require the proponent to monitor the impacts of parasites and diseases on wild salmon in order to verify the accuracy of their predictions and evaluate the effectiveness of the proposed mitigation measures. This would need to be done by directly monitoring lice and disease loads directly on wild salmon.
 - ii. Ecological interactions between wild and escaped farmed salmon are also key public and scientific concerns that have been assessed by the proponent to be non-significant. As noted previously, we have serious concerns about this conclusion based on lack of data regarding the movements and interactions of both wild and escaped farmed salmon in Placentia Bay. Some of the data required to accurately assess ecological interactions cannot be collected prior to production (e.g., movement, distribution, feeding, etc. of escaped farmed salmon). This is clearly an area where follow-up investigation and monitoring is required.
 - iii. The proposed monitoring program does not address the salmon-related key issue that forms the basis for the EIS i.e., “preserving the genetic integrity and biological fitness of wild Atlantic

salmon” (EIS Guidelines p. 15). While monitoring things like the movements of farmed salmon into wild salmon rivers and lice and disease loads on wild salmon are vital for understanding the environmental impacts of the project and effectiveness of mitigation strategies, monitoring these issues does not directly measure impacts on genetic integrity or biological fitness. Measuring impacts on these dimensions requires monitoring relevant indicators e.g., genetic population structure and abundance of wild salmon populations. As noted above, sufficient baseline data on these variables have not been collected to facilitate the design of relevant monitoring programs.

- iv. While not salmon-related, we note that the proponent has been directed to consider a monitoring program for the direct and indirect genetic and ecological interactions between escaped farmed lumpfish and wild lumpfish; however, this was not mentioned in their brief description of their proposed monitoring program. Given the status of lumpfish and the issues we have identified with the effects assessment related to genetic interactions of wild and farmed lumpfish (see point 2c above), there is clearly a need for a monitoring program on lumpfish.

The design of monitoring programs is an integral part of the environmental assessment process. We note once again that the stated purpose of monitoring is to “verify the accuracy of the predictions made in the assessment of the effects as well as the effectiveness of mitigation measures” (EIS Guidelines p. 29). Since this project was first registered for environmental assessment, the proponent has repeatedly claimed that it will have no significant environmental impact – a claim which contradicts a large and constantly increasing body of evidence from everywhere in the world this industry operates, including evidence of significant impacts on the genetic integrity of wild south coast Newfoundland salmon. Ultimately, the only way to prove this claim is through the design and implementation of a rigorous and robust science-based monitoring program. That the proponent has chosen to not commit to such a program is highly concerning and calls into question their ability to deliver on their claims and their commitment to ensuring environmental protection.

We also note that the proponent’s claim of no impacts on wild salmon has not been well received by the public and has provided the basis for significant mistrust and public opposition. The proponent’s failure to back their claims with an appropriate monitoring program will not answer the concerns of the public. Indeed, it is likely to further compound mistrust and opposition. Conversely, a well-designed and transparent monitoring program that verifies the proponent’s claims would go a long way to reducing public opposition to the project (and to the proponent’s plans for future expansion). Given this, the proponent’s failure to design an appropriate monitoring program can only be viewed as a deliberate attempt to avoid scrutiny and transparency, and as a lack of commitment to environmental protection. This is unacceptable and runs counter to the principles of environmental assessment and to the specific instruction provided to the proponent.

4. Superficial evaluation of project alternatives with unjustified conclusions

The proponent was directed to analyze advantages and disadvantages of alternative methods of carrying out the undertaking, with specific reference to, (among other things) land-based vs. sea farm operations. This was included largely based on extensive public comments questioning “why land-based closed containment was not discussed or made compulsory as an alternative” (Watton Memo p. 14). The EIS guidelines provide significant guidance for this analysis, including the requirement to provide sufficient rationale and information to justify rejection of alternatives. The proponent concluded that land-based grow out was not a viable

alternative. However, the analysis in support of this conclusion is highly superficial, based on incomplete and contradictory information and an unclear rationale.

Here we provide a number of examples where the proponent makes unsupported, unquantified, and irrational statements and arguments in support of their rejection of the land-based alternative:

- a) p. 112 – “Sea cages utilize ocean currents to move water [...] therefore, reducing the carbon footprint of production” and p. 117 “The carbon footprint of salmon produced at land-based aquaculture facilities is twice that of salmon produced in traditional open net pen systems (Liu 2016)”. What is the evidence that the carbon footprint of sea cages will be lower than that of land-based production for this project? Many factors go into calculating carbon footprint like the source of electricity, use of boats, and the distance of sea cages from land-based hatcheries and processing plants. Furthermore, the proponent misrepresents the information presented by Liu (2016). To arrive at the conclusion that land-based has twice the carbon footprint as net pen, Liu (2016) used a scenario in which the electricity for the land-based system was generated with significant reliance on coal and gas. However, Liu (2016) also notes that the carbon footprint of a land-based system using electricity generated by 90% hydropower/10% coal is 45% lower than the coal/gas scenario. Given that most (if not all) of the electricity that would be used to power land-based facilities on the Burin Peninsula would come from hydro and that there would be no need to use boats (powered by fossil fuels) under a land-based scenario, the proponents have provided no basis for concluding that the carbon footprint of land-based grow out would be higher than that for sea-cages in this project. If the proponent wishes to use carbon footprint arguments to justify sea-cages over land-based, they need to provide quantitative information for each of the specific scenarios being compared. The paper they cite (Liu 2016) provides a detailed methodology for conducting such an analysis.
- b) p. 112 – “In the marine environment, fish can be stocked at densities that use less than 4% of the cage space [...] this activity produces less stress and consequently a healthier fish.” This statement has been made without providing any evidence that sea cages produce less stressed and healthier fish. One could easily argue (as land-based producers do) that the fully controlled environment of a closed system is less stressful for the fish because they are not exposed to uncontrollable variations in temperature and oxygen concentration nor are they exposed to parasites and diseases prevalent in the natural environment. Indeed, it is for these reasons that fish grow faster in land-based systems. The proponent should not be permitted to make statements such as this without providing supporting evidence.
- c) p. 117 – “A total land-based facility would require an extensive amount of land, electricity, and water.” This statement seems to suggest this as a reason for rejecting the land-based alternative. However, the proponent has not provided any analysis of the availability or cost of these resources and how they compare to the availability/costs of resources required for sea cages. Neither land, nor water, nor electricity are likely to be in short supply in Newfoundland during the life of the project. Furthermore, the proponent does not appear to have any issues using large amounts of land, electricity, and water for their hatchery and post-smolt facility. If unavailability of these resources is a reason for rejecting the land-based grow-out alternative, a clearer rationale and quantitative analysis need to be provided.

- d) p. 117 - “the provision of marine water that replicates the natural environment of the ocean is essential for the adult stage of Atlantic salmon” and p. 112 “the marine environment is an ideal culture environment for Atlantic salmon as this is their natural habitat.” These statements reflect a lack of understanding of basic salmon biology. Atlantic salmon is a freshwater species that may or may not have an anadromous (i.e., sea going) form. That is, they can complete their life cycle entirely in freshwater without the need for migration to marine waters. Furthermore, the suggestion that Placentia Bay is the “natural habitat” for adult Atlantic salmon is also misleading. As the proponent notes elsewhere in the EIS, Atlantic salmon migrate through Placentia Bay during spring and summer but are not resident there. Indeed, it would be highly unusual to find a wild Atlantic salmon in Placentia Bay over winter because inshore waters do not provide suitable salmon habitat during that time. Salmon need to migrate elsewhere to find optimal water temperatures and prey. Holding salmon in cages in inshore waters for extended periods is neither essential for salmon nor is it providing them with their “natural habitat.” Statements such as this should not be used to justify the need for sea-cage grow out. Although they fail to acknowledge it, the proponent is surely fully aware that salmon are currently being commercially produced in land-based freshwater systems. These statements are clearly intended to mislead the public into believing that sea cages are a necessary component of salmon aquaculture when, in fact, they are not.
- e) pp. 116-117 – the proponent claims significant technical challenges with growing salmon in land-based systems including: 1) difficulties growing fish past 1kg; 2) problems associated with early maturation of males; and 3) the need to stock at higher densities in RAS systems. However, information provided by the proponent elsewhere in the EIS contradicts these claims: on p. 112 they note that they will grow post-smolts past 1kg (up to 1.4kg) in their land-based RAS facility; on p. 115 (and many other places throughout the document) the proponent explains that they plan to use all-female fish, thus eliminating any concerns about early maturation of males; and despite citing the need to grow fish at higher densities as a disadvantage to land-based systems, on p. 116 they claim that the potential for higher stocking densities is an advantage of land-based systems. Thus, none of the technical challenge they cite as reasons for rejecting land-based systems appear to be valid.
- f) p. 117 – the proponent claims that the economics of land-based operations are not favourable compared to net pens; however, they provide very little quantitative information to justify this conclusion. They claim that the cost of a land-based system would be 5.5 times higher than marine based cage systems, but do not adequately explain how they arrived at this figure. We note that a reference previously provided by the proponent (Liu 2106) indicates that the costs associated with construction are higher for land-based facilities (by approximately 80%) but that the cost of production is approximately equal to that of sea cages. This information does not seem to support their conclusion that a land-based system would be 5.5 times higher. If the proponent wishes to use economic factors as a reason for rejecting land-based alternatives, they need to provide quantitative economic information for each of the specific scenarios being compared. Liu (2016) provides a detailed methodology for conducting such an analysis.
- g) table 2.24 – the proponent scores “regulatory issues” as a -1 indicating that land-based alternatives perform less well on this dimension than sea cages. The only justification for this scoring is found

on page 118 where they state that, “it may well be that regulators would be challenged to deal with compliance issues for such a facility.” This justification is nothing more than complete and unfounded speculation. Clearly, the proponent has no idea how regulators would respond to a land-based grow out facility. We point out, however, that the proponent plans to use land-based facilities for both smolt production and post-smolt production. Clearly, neither the proponent nor the regulators see any insurmountable compliance issues with those facilities. On what basis does the proponent claim that regulators will be challenged to deal with compliance issues for a land-based grow-out facility? If the proponent wishes to score the land-based alternative poorly on the basis of regulatory issues, more information and a stronger rationale are needed.

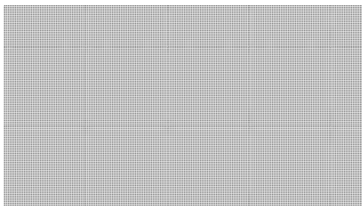
Based on significant public concern, the proponent was required to analyze land-based alternatives and provide a clear justification for rejection. However, as described above, the analysis provided by the proponent is highly superficial and misleading. Indeed, the proponent has not even acknowledged the massive growth in investment in land-based RAS salmon farming projects over the past two years. We note that since the Placentia Bay project was first registered for environmental assessment, three land-based RAS projects which collectively aim to produce up to 130,000 metric tonnes/year have been announced for the eastern seaboard of the United States (which, as noted in the EIS, is the primary market for Newfoundland aquaculture salmon). Given the public awareness surrounding these projects, it is highly unlikely that the public will find the analysis and rejection of the land-based alternative to be very convincing.

Conclusions

In summary, the Atlantic Salmon Federation reiterates our profound disappointment with the EIS submitted by Grieg NL Seafarms for the Placentia Bay Aquaculture Project. The EIS was deemed necessary by the EA Division, the conservation community, First Nations, many members of the general public, and the Supreme Court of Newfoundland and Labrador. The documents provided and the information and arguments contained within are an insult to all of those individuals and organizations and to the threatened wild Atlantic salmon of southern Newfoundland. The EIS does not adequately address the issues which formed the basis on which it was ordered, nor does it meet the minimum standard for acceptance as specified in guidelines issued to the proponent. To accept this EIS without requiring the proponent to conduct further work would make a mockery of the entire environmental assessment process. The EIS should be deemed deficient by the EA committee and sent back to the proponent to conduct the work necessary to meet the EIS guidelines.

Thank you for consideration of our concerns and recommendations. Please do not hesitate to contact us should you have any questions or wish to further discuss these issues with us.

Sincerely,



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References

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Goodbrand et al. 2013. Sea cage aquaculture affects distribution of wild fish at large spatial scales. *Canadian Journal of Fisheries and Aquatic Sciences*, 2013, 70(9): 1289-1295

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Liu, Y., Rosten, T.W., Henriksen, K., Hognes, E., Summerfelt, S., Vinci, B. 2016. Comparative economic performance and carbon footprint of two farming models for producing atlantic salmon (*salmo salar*): Land-based closed containment system in freshwater and open pen in seawater. *Journal of Aquaculture Engineering*. 71:1-12.

Shephard S, Gargan P. 2017, Quantifying the contribution of sea lice from aquaculture to declining annual returns in a wild Atlantic salmon population. *Aquaculture Environment Interactions* 9:181-192

FOR COMMENTS AND CONCERNS	SECTION	PAGE	EIS COMMENTS
1. Lack of original data collection to augment the information presented in the project registration document			
<ul style="list-style-type: none"> The EIS guidelines demonstrates a clear requirement that the EIS entails the collection of original data to fill the identified data gaps. This was not done. The evaluation of potential impacts on wild salmon is based on incomplete information and faulty assumptions, baseline data are not available from which to develop monitoring programs, and the requirements and objectives of the EIS guidelines have not been met. Of the 3 years plus 2 optional one-year extensions available, the proponent used 2 months and 10 days to complete the EIS. Migration patterns and habitat use of wild salmon within Placentia Bay are key to understanding the potential impacts from the project and designing appropriate monitoring programs. <ul style="list-style-type: none"> Most of the proposed cage locations are in prospective salmon migratory routes, but "Atlantic salmon migratory corridors in Placentia Bay have not been identified in the literature." The proponent continues to identify this data gap as limiting their 	<p>Volume 1</p> <p>Sec. 3.5</p> <p>Section 4.2.4</p> <p>Volume 3</p> <p>CS 1A</p> <p>Section 4.1</p>	<p>Pg.129</p> <p>Pg. 173-176</p> <p>Pg. 3-7</p>	

<p>ability to accurately predict impacts.</p> <ul style="list-style-type: none"> - The proponent notes “a study planned for Placentia Bay this year will hopefully provide some information on migratory corridors in the bay.” If this study is imminent and will provide the necessary data, why has the EIS been submitted before it has been completed? These data are needed now, at the assessment stage. A study to provide the necessary data is planned for the near future, therefore the proponent should be required to ensure that these data are appropriately incorporated into the EIS. Data and knowledge gathered could require substantial changes to siting and mitigation measures and could materially change the project that is described in the EIS. • Abundance of threatened wild salmon in Placentia Bay is a key piece of information necessary for evaluating and assessing impacts. <ul style="list-style-type: none"> - The proponent continues to rely only on angling license returns for estimating abundance. - The proponent presents a table of catch statistics for individual rivers from 2012-2016, but provides 			
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<p>no actual estimates of population abundance in these rivers.</p> <ul style="list-style-type: none"> - Information provided is not sufficient to fill the data gaps identified in the screening review and does not meet the criteria described in the EIS guidelines. - Collection of abundance data for the key rivers in Placentia Bay is not difficult and could easily be done within the time allocated for EIS preparation. A study could be easily designed to estimate abundance of wild salmon in Placentia Bay and this information could be used to predict and evaluate impacts and design appropriate monitoring programs. • Data on the genetic structure of wild salmon populations is vital for predicting and monitoring direct and indirect genetic impacts from the proposal. <ul style="list-style-type: none"> - Little detail is provided, particularly for Placentia Bay populations, which are a subset of the South Newfoundland population. This information is clearly not adequate for predicting or monitoring impacts and therefore does not meet the criteria outlined in the EIS guidelines. 			
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<ul style="list-style-type: none"> - Characterizing the genetic structure of Placentia Bay salmon populations would not be difficult, it simply requires collecting appropriate samples from Placentia Bay rivers and having them analyzed by an expert in population genetics. • The component studies provide little information that was not already considered in the screening review and therefore leave most of the data gaps unfilled. • Resulting evaluation of impacts and mitigation strategies are lacking depth and rigour and the conclusions cannot be justified. • We recommend that the component studies be judged as “deficient” and sent back to the proponent with specific instructions to follow the EIS guidelines as previously outlined. 			
2. Evaluation of potential impacts is not rigorous, balanced, reasonable, or transparent, resulting in conclusions that are not justified.			
<ul style="list-style-type: none"> • The EIS is entirely deficient in terms of information regarding ecosystem and population ecology of wild salmon needed to make meaningful predictions of effects or to design an appropriate mitigation and monitoring program. 	Volume 1 Sec. 2.4.1.1 Sec. 3.7 Sec. 7.7	Pg. xxxiv Pg. 12-18 Pg.131-138 Pg. 432-446	

<ul style="list-style-type: none"> • The lack of data accentuates the need to apply the precautionary approach. The assessment should be conducted under the assumption that harmful interactions between wild and farmed salmon will occur. • Evaluation of impacts section in the EIS is neither rigorous not transparent. In many cases it is not clear how the ratings (e.g., significant vs. non-significant; level of confidence) are arrived at. • The assessment of effects appears to be highly subjective with no evidence that the same conclusions would be reached if the analysis was repeated by someone with a different perspective. The conclusions regarding wild salmon, (i.e., that none of the identified interactions or impacts will be significant) are not justified by the analysis. • Proponent claims that there is no possibility of genetic interaction between wild and escaped farmed salmon because the farmed salmon will be 100% sterile triploid fish <ul style="list-style-type: none"> - The proponent claims that their egg supplier has developed new methods of triploidy induction/ verification that result in fish that are 100% sterile and female. No evidence to support this claim has been presented, and few details about the actual triploidy induction process has been provided. 	<p>Volume 3</p> <p>CS 1A</p> <p>Sec. 4.2</p> <p>Sec. 4.3</p> <p>Sec. 4.8</p> <p>CS 1B</p>	<p>Pg. 7-12</p> <p>Pg. 12-15</p> <p>Pg. 37-53</p>	
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<ul style="list-style-type: none"> - A search of the egg supplier's website and of the scientific literature revealed no proof of this claim. • EIS guidelines state that "mitigation failure should be discussed with respect to risk and severity of consequences." (p.27) We are unable to find a discussion of the risks and consequences should this key mitigation strategy fail to produce 100% triploid all-female stock. • Proponent states that "the potential effect of an escape of juvenile lumpfish is not of concern with respect to genetic integrity of and ecological interaction with wild lumpfish given their sexual maturity status and their brood stock is from Newfoundland waters" (EIS p.440) <ul style="list-style-type: none"> - They conclude the effects of escaped lumpfish on wild lumpfish will be non-significant. This statement and conclusion are based on incorrect assumptions not consistent with basic biology and the wealth of scientific information about domestication of wild animals. - The precautionary approach dictates that one assume there are differences that could result in impacts and conduct the effects prediction accordingly. There is no basis for the conclusion that genetic 			
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<p>impacts on wild lumpfish will be non-significant.</p> <ul style="list-style-type: none"> • There is no review of the extensive literature demonstrating the significant impacts of sea lice transfer on wild salmon. <ul style="list-style-type: none"> - Much important information is missing, including the magnitude of impacts from sea lice infestations that spread from fish farms to wild salmon, and the correlation between lice levels in cages and impacts on wild salmon. - At what level do lice infections begin to cause problems for individual wild salmon smolts and adults? - To what levels should sea lice in cages be controlled in order to avoid impacting wild salmon? - What operational and monitoring practices are most effective for controlling sea lice at levels to avoid impacting wild salmon? • The use of cleaner fish is inappropriately viewed as a mitigation measure for the control of sea lice on wild Atlantic salmon. <ul style="list-style-type: none"> - Cleaner fish, and other lice control methods, are used primarily as a mechanism to keep sea lice levels adequate for the profitable production of farmed salmon. • The use of cleaner fish is incorrectly viewed as having a 			
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<p>positive impact on wild salmon. At best, the use of cleaner fish can be considered a potential harm-reduction measure.</p> <ul style="list-style-type: none"> • Inadequate data has been provided to understand how wild salmon smolts and adults will interact with sea cages and sea lice dispersed from cages. • Effects of sea lice on wild salmon under the scenario of mitigation failure have not been assessed. <ul style="list-style-type: none"> - Uncontrolled sea lice outbreaks are common in the salmon aquaculture industry. - It is not clear at what levels of infestation alternative options will be implemented nor how effective they will be at preventing infection in wild fish during an active outbreak. • The proponent provides no information about the current situation regarding sea lice presence and prevalence in the existing industry. • Impacts of the use of pesticides and antibiotics on the marine environment have not been adequately addressed in the EIS <ul style="list-style-type: none"> - Failure to evaluate the potential impacts of pesticide use under the scenario of mitigation failure is not consistent with the guidelines provided to the proponent. 			
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<ul style="list-style-type: none"> - In the EIS the proponent admits antibiotics will be used as required. - The proponent concludes that there will be no significant impacts of antibiotics despite no evidence being presented about the effect of antibiotic use on the receiving environment, wild species, or human health. • Ecological interactions are a concern when large numbers of fish escape from sea cages. <ul style="list-style-type: none"> - Proponent claims that “escaped salmon are not expected to interact ecologically with wild salmon” (EIS pp. 440, 447). However, very little rationale is provided for that statement. - No information has been presented to support these statements and assumptions. - The proponent has no way of knowing what the interactions between escaped farm salmon and wild salmon will be, or what the outcomes might result. Where data are lacking, the precautionary principle dictates that the analysis be conducted under the assumption that harmful interactions will occur. - It is worth nothing that the emergency scenario (2,000,000 farmed salmon accidentally released in early summer) would 			
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release 400 times the estimated Placentia Bay wild salmon population at a time when both smolt and adult wild salmon would be present in the bay. The proponent's conclusion that there will be no significant impacts from such a large-scale spill is based on an overly simplistic analysis with no supporting data.			
3. Lack of meaningful detail about the proponent's approach to follow-up monitoring programs			
<ul style="list-style-type: none"> Follow-up monitoring program design is an integral part of an environmental assessment. Rather than provide the required details on their proposed approach, the proponent has simply stated that "the EEMP will clearly outline the objectives of monitoring, methodology, criteria for adaptive management, identification of procedures to test the efficacy of mitigation measures and follow-up monitoring, and a communication plan for disseminating findings" (EIS p.475). It is not sufficient to monitor movement of escaped farmed salmon into rivers only after reportable escape events. Important to have ongoing monitoring of the movements of escaped farmed salmon into the rivers of Placentia Bay. Salmon farms can act as "bird feeders", drawing in and 	<p>Volume 1</p> <p>Sec. 3.7.8</p> <p>Sec. 7.8</p> <p>Volume 3</p> <p>Sec. 4.8</p> <p>Sec. 4.9</p>	<p>Pg. 137</p> <p>Pg. 475-477</p> <p>Pg. 37-55</p> <p>Pg. 55-56</p>	

<p>concentrating wild fish thereby potentially exposing them to parasites, diseases, and predators as well as disrupting normal migratory patterns.</p> <ul style="list-style-type: none"> • Clearly, there is an expectation that monitoring programs be designed for areas of concern and for any mitigation procedures that have been proposed. There are a number of other areas where monitoring plans are needed. <ul style="list-style-type: none"> - Disease and parasite transfer from farmed to wild salmon. - Ecological interactions between wild and escaped farmed salmon. - “Preserving the genetic integrity and biological fitness of wild Atlantic salmon” (EIS Guidelines p.15). Sufficient baseline data on these variables have not been collected to facilitate the design of relevant monitoring programs. - The proponent has been directed to consider a monitoring program for the direct and indirect genetic and ecological interactions between escaped farmed lumpfish and wild lumpfish; however, this was not mentioned in their proposed monitoring program. 			
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4. Superficial evaluation of project alternatives with unjustified conclusions			
<ul style="list-style-type: none"> • The proponent concluded that land-based grow out was not a viable alternative. However, the analysis in support of this conclusion is highly superficial, based on incomplete and contradictory information and an unclear rationale. • “Sea cages utilize ocean currents to move water [...] therefore, reducing the carbon footprint of production” (p. 112) and p.117 “The carbon footprint of salmon produced at land-based aquaculture facilities is twice that of salmon produced in traditional open net pen systems” What is the evidence the carbon footprint of sea cages will be lower than that of land-based production for this project? <ul style="list-style-type: none"> - If the proponent wishes to use carbon footprint arguments to justify sea-cages over land-based, they need to provide quantitative information for each of the specific scenarios being compared. • “In the marine environment, fish can be stocked at densities that use less than 4% of the cage space [...] this activity produces less stress and consequently a healthier fish” (p.112) <ul style="list-style-type: none"> - This statement has been made without providing any evidence that sea cages produce less stressed and healthier fish. 	<p>Volume 1</p> <p>Sec. 2.7</p>	<p>Pg. 109-118</p>	

<ul style="list-style-type: none"> • “A total land-based facility would require an extensive amount of land, electricity, and water.” (p.117) <ul style="list-style-type: none"> - This statement seems to suggest this is a reason for rejecting the land-based alternative. However, the proponent has not provided any analysis of the availability or cost of these resources and how they compare to the availability/cost of resources required for sea cages. • “Provision of marine water that replicates the natural environment of the ocean is essential for the adult stage of Atlantic salmon” (p.117) and “the marine environment is an ideal culture environment for Atlantic salmon as this is their natural habitat” (p.112) <ul style="list-style-type: none"> - These statements reflect lack of understanding of basic salmon biology. • Proponent claims significant technical challenges with growing salmon in land-based systems including: 1) difficulties growing fish past 1 kg; 2) problems associated with early maturation of males; and 3) the need to stock at higher densities in RAS systems. <ul style="list-style-type: none"> - Information provided by proponent elsewhere in the EIS contradicts these claims: on p.112 they note they will grow post-smolts past 1kg (up to 1.4kg) in their land-based RAS facility. 			
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<ul style="list-style-type: none"> - On p.115 (and many other places throughout the document) the proponent explains that they plan to use all-female fish, thus eliminating any concerns about early maturation of males. - And despite citing the need to grow fish at higher densities as a disadvantage to land-based systems, on p.116 they claim that the potential for higher stocking densities is an advantage of land-based systems. - Thus, none of the technical challenge they cite as reasons for rejecting land-based systems appear to be valid. • Proponent claims that the economics of land-based operations are not favourable compared to net pens; however, they provide very little quantitative information to justify this conclusion. • Proponent scores “regulatory issues” as a -1, indicating that land-based alternatives perform less well on this dimension than sea cages. <ul style="list-style-type: none"> - On what basis does the proponent claim that regulators will be challenged to deal with compliance issues for a land-based grow-out facility? 			
<ul style="list-style-type: none"> • The EIS should be deemed deficient by the EA committee and sent back to the proponent to conduct the 			

work necessary to meet the EIS guidelines.			
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No information has been removed or severed from this page

Johnson, Roger

From: Kelly, Jason
Sent: Friday, June 29, 2018 1:34 PM
To: Johnson, Roger
Subject: RE: EA

Thanks Roger

From: Johnson, Roger
Sent: June-29-18 11:56 AM
To: Kelly, Jason
Subject: EA

Just spoke with Susan Squires EA director with the province (she is handling the EA as Joanne Sweeny [REDACTED])

Conversation went well and now she knows my name and role and the role of FPP.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

s.19(1)

Kelly, Jason

From: Kelly, Jason
Sent: June-29-18 4:15 PM
To: Griffiths, Helen
Cc: Johnson, Roger
Subject: FW: Approved Science Response - Grieg EIS
Attachments: Grieg PB Aquaculture EIS SRR - June 28.docx

FYI

From: Parrill, Erika
Sent: June-29-18 3:31 PM
To: Johnson, Roger
Cc: Kelly, Jason; Richards, Dale E
Subject: Approved Science Response - Grieg EIS

Hi Roger,

Please see attached for the Grieg EIS Science Response Report. It has now been approved by Ben as A/Regional Director of Science. I suspect it will be posted on the CSAS website in 3-4 weeks.

If you have any questions, please do not hesitate to pop me a message.

Cheers,
Erika

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309



Fisheries and Oceans
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Pêches et Océans
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Oceans Science

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et des océans

Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the NL *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the NL Region of Fisheries and Oceans Canada (DFO) requested that Science undertake a review of specific sections of the EIS for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. DFO Science undertook a Science Response Process for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the Proponent;
- The level of certainty in the conclusions reached by the Proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the Proponent's methodologies and conclusions);
- The follow-up program proposed by the Proponent; and
- Whether additional information is required from the Proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated Component Studies and Appendices. The EIS documents are available on the Government of NL's Department of Municipal Affairs and Environment [website](#).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

This Science Response Report results from the Science Response Process of June 25, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 - Project Rationale
 - Section 2.4.3 - Land-based Facility (RAS hatchery)
 - Section 2.4.4 - Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 - Physical Environment
 - Section 4.2.3 - Fish and Fish Habitat
 - Section 4.2.4 - Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 - Wild Salmon VEC
 - Section 7.9.2 - Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

DFO Science's assessment of the risks associated with the proposed Project identified a long list of significant uncertainties. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100%, and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature, and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation (DFO 2016).

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs).

Page xxxi. Assessment Boundaries. The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species. Also, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true; most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the one year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for the Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed Project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016).

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would provide a better context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Page. 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach should begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p. 17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia)." The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reevaluated.*

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern."* As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still thousands of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not commonly used by industry.

Page 45. It states that Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts would not be recommended in areas of low oxygen.

Page 52. Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. If so, on what frequency or under what conditions, or is it only in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes."* This suggests that all nets are

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

replaced approximately every year. Additional detail is requested on net replacement and maintenance.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see new initiatives being explored such as the use of cleaner fish for sea lice control, use of Lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger Lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the Lumpfish placed in cages may actively feed. Additional details are required on the use of Lumpfish (e.g. size and non-feeding Lumpfish protocols, and transfer of pathogens/diseases from Lumpfish to salmon).

The stock origin of the Lumpfish (cleaner fish) is not clear. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and Lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc. is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how cross-contamination will be avoided as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination."* However, the Proponent will use routes crossing BMAs, as shown in Figure 2.53, thereby not mitigating risk of cross-contamination.

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Page 91. Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically*

Newfoundland and Labrador Region **Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.**

once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.” Please revisit and clarify for consistency.

Page92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: “The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites.” In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. “Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish.” While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue.

Page 99. The statement: “In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality” is unclear as only one intense winter could be problematic. A recent example is the superchill event in 2014, which significantly impacted the industry in nearby Fortune Bay and Bay d’Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland Shelf) region?

Page 100. “A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated.” These data would be highly valuable to industry regulators and should

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) website indicates the following ISA events reported for Newfoundland: 2012 - three; 2014 - four; 2017 – two; and 2018 – two. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location. However, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail and seems optimistic that there would be little to no problems.

Section 3.0 – Effects Assessment Methodology

Page 130. Project Area. Potential for runoff from the Marine Industrial Park due to a tank rupture was not included in the evaluation of the project area. This should be revisited.

Page 130. Study Area. It states that *“The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA”* and that *“This is considered the maximum extent wherein there is potential for effects of the Project to occur...”* Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *“The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer.”* The sentence *“The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter”* is unclear. Please revisit and clarify.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 141. "A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period." A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate. However, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the Study Area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: "*Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important.*" This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of data (i.e. spring and neap cycle in Newfoundland wind forcing and the Labrador Current are variable on timescales of days to seasons [or more]); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.

Page 145. Flood and Tidal Zones. "*During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.*" A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see Bedford Institute of Oceanography's Oceanographic Databases; and DFO's Marine Environmental Data Section)

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if there were collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in Green Crab density, this information is available from studies performed in Placentia Bay (see Matheson et al. 2016).

Information is presented in this section regarding eelgrass restoration only. Eelgrass is considered an ecologically significant species (see DFO 2009; Rao et al. 2014), and information on existing eelgrass sites within the bay should be provided.

Page 166. There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is a concern.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. This is recommended in light of the lease sizes, the proximity of sites to Marine Protected Areas (MPAs), and the overall potential cumulative effect of deposition after stocking.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as “threatened.” COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. The authors of the COSEWIC report also indicated that with respect to south Newfoundland, had the analysis extended back one single year (i.e. over 16 years) south Newfoundland would have met the criteria to be designated as “Endangered.” Several individual stocks in nearby Bay d’Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in NL. A retrospective analysis of salmon returns to Conne River for the years 1976-85 (10-years prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first four years of the fish counting fence operation (1986-89) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence (Moores et al. 1978). More discussion of historical and current studies should be provided.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending ‘several months’ in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.

Page 175. The document states “Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature” yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al. 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs within the Study Area, with the exception of Northeast River, Placentia. The use of angling data, however, can be problematic. Stock assessments are not routinely carried out on rivers for which only recreational catch data are available. Reasons

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

include: numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "is potentially quite risky."

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.

As noted in the EIS, superchill events have already occurred on the south coast of Newfoundland in 2014. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification." The time-series presented and used for this Project are much too short to confidently support this statement. Also, the statement is not quantitative; the term "adequate" should be defined in this context.

Page 352. Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Section 7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the potential for negative environmental effects is not significant, but the Proponent has assigned a medium level of confidence throughout these tables. A medium level of confidence would indicate that the risk of each outcome cannot be in fact "not significant."

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. much too short) the estimated benthic loading of carbon provided in this section is not representative of what will eventually occur (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles."* As stated above, recovery might not happen within timelines selected for fallowing by the Proponent. However, at this stage only regulatory requirements through DFO Aquaculture Activities Regulations (AAR) will determine compliance.

Page 369. Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p. 370).

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

Section 7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

Section 7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be deleted (Glover et al. 2016).

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% escape-proof.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.

Page 436. The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys. DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: *"...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon"* is not substantiated. Although triploidy will

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 Lumpfish cleaner fish) would not have a significant impact on wild salmon. On the contrary, an escape of 160,000 farmed salmon would likely have a significant effect on the wild salmon population (approximately 20,000 fish). Such a statement should have a higher level of confidence than that indicated in the EIS document (medium).

Section 7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions,

Page 476. Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

Section 7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: *“Overall, planned Project activities on the wild salmon VEC were predicted to be not significant”*. The Proponent outlined in detail the various mitigation measures that will be implemented, many of which are to be commended. Although numerous mitigation measures have been built into the proposed Project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are statements that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

Page 480. It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, at best it would be low.

Section 8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect *‘alter genetic integrity...’* it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 4, Para. 2. Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.

Page 5. It states that *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL, the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past two consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey."* This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river. However, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

**Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification
and Verification (All-Female Triploid)**

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again, data are not provided.

**Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency
Response Plan**

Page 31. It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible.' Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Component Study: Fish and Fish Habitat

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."* However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of one month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of one year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste,"* which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping 20 hours to a few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tide is a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General Comment. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 28. *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* Information on the tidal analysis results is required.

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented are even less reliable. The dataset used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.

Conclusions

Overall, the EIS documents are extensive and the topics considered within the relevant sections are generally appropriate. However, the level of certainty in the conclusions on risk characterization is insufficient and requires additional information and/or sampling.

The objective of this review was to evaluate:

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- Additional physical environmental data should be collected at each site. A longer time-series of ocean currents, in particular, should be collected as well as profiles of water salinity; the former due to its importance for dispersion modeling and monitoring, and the latter due to its importance on sea-lice life cycle.
- A lot of outdated material is cited where more recent material exists. Also, some inaccurate statements are found in the reports.

The mitigation measures proposed by the Proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination. However, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the Proponent on the effects;

- Assessment of the risks associated with the proposed Project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. The data do not support this conclusion.

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the Proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to provide statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each site) was used to make conclusions regarding suitable siting locations.

The follow-up program proposed by the Proponent;

- As the EEMP has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; additional sampling at each site and in areas between the BMAs to provide information on presence of and potential for organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Whether additional information is required from the Proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Approved by

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June 29, 2018

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

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**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

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Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.

This Report is Available from the

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*MPO. 2018. << insérez le titre ici – il doit correspondre exactement à celui de la page
couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.*

Johnson, Roger

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 7:37 AM
To: Pilgrim, Bret
Cc: Decker, Shelley
Subject: Grieg

I have the small boardroom booked for most of the day to go over our Grieg piece – do not know if we will need it

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 8:37 AM
To: Powell, Shawna
Subject: Grieg

I was wondering if I could expect the Grieg comments from Oceans today – I need to get comments rolled up and it would be helpful to have all sectors in front of me when I do that to avoid the inevitable overlap.

Sorry for being a pest but that's the way of EA

Roger Johnson
Sr. Biologist - Mining
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Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 9:09 AM
To: Johnson, Roger
Subject: Grieg - Comms

Hey Roger

Going to engage Comms on this to give them a heads up on Grieg file, as suggested by RDG on Friday. Any time tomorrow or Wednesday not good for you? Stella [REDACTED]

s.19(1)

Johnson, Roger

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 9:31 AM
To: Decker, Shelley; Pilgrim, Bret
Subject: FW: Oceans NL Review Grieg EIS 2018.docx
Attachments: Oceans NL Review Grieg EIS 2018.docx

From: Powell, Shawna
Sent: Tuesday, July 3, 2018 8:52 AM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Cc: Mercer, Dawn <Dawn.Mercer@dfo-mpo.gc.ca>; Turner, Kelli <Kelli.Turner@dfo-mpo.gc.ca>
Subject: Oceans NL Review Grieg EIS 2018.docx

Good morning Roger – Attached are comments on the aquaculture EIS. Any questions, please contact Dawn or Kelly.

Thanks,
Shawna

Oceans NL Review

Grieg NL, EIS of the Placentia Bay Atlantic Salmon Aquaculture Project 2018

3.6.2.2 Study Area, pg. 130

The CSAS delineation of EBSAs will require future changes to the Placentia Bay Extension EBSA description, including its boundaries. A revised document is still in prep as of June 2018. The number of EBSAs is also expected to change with this current delineation. No changes required at this time.

4.2.6.2 Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA), pg. 195.

1st Paragraph: Previous initiatives undertaken within LOMAs will be adapted to the five priority marine bioregions: the Gulf of St. Lawrence, the Scotian Shelf, the Newfoundland-Labrador Shelves, the Western Arctic, and the Northern Shelf. It is recommended that this paragraph and references to LOMAs be removed.

2nd paragraph: See comment under 3.6.2.2 Study Area.

4.2.6.4 Other Sensitive Areas

Marine Protected Areas, pg. 202

2nd sentence: Proper terminology is 'other effective area-based conservation measures'.

Deep-sea Corals and Sponges, pg. 202

Last paragraph: Several Marine Refuges have been designated in Eastern Canada's marine waters with the conservation objective to protect cold water sponges and corals which should be added to this section. None are located within the study area. <http://www.dfo-mpo.gc.ca/oceans/oeabcm-amcepz/refuges/index-eng.html>

4.8.3 Sensitive Areas VEC, pg. 345

First paragraph: See comment under 3.6.2.2 Study Area.

7.4 Sensitive Areas VEC

Table 7.14, pg. 404: For both Fish and Fish Habitat (Table 7.1) and Birds (Table 7.7) potential interactions with lights are included, however, in Table 7.14 they are excluded. This would be inconsistent given that both fish and fish habitat and birds are principle components that were used to identify the Placentia Bay EBSA.

General Comment: Throughout Section 7.4 one of the key mitigations is avoidance of sensitive areas. This requires clarification as the EBSA as a whole has been listed as a sensitive area in this EIS. In addition, principle components which led to the EBSA's identification are also included as

sensitive areas such as important areas for ichthyoplankton while all 11 sea cage sites will overlap areas of high ichthyoplankton aggregation

7.7.3 Sensitive Areas VEC, pg. 467

Interactions between the SA VECs and fish escape scenarios are not assessed here and the rationale provided for this is that these scenarios primarily relate to effects on fish and fish habitat assessed in 7.7.1. They should be added for consistency between tables.

The following should be reviewed by DFO Science

7.4 Sensitive Areas VEC

This EIS describes sensitive habitat as important areas for ichthyoplankton while stating that all 11 sea cage sites will overlap areas of high ichthyoplankton aggregation, however, for mitigation of sea cage installation, sea cage deposition as well as other project activity effects, the key measure listed in Table 7.15 is to avoid the area.

The assessment of effects in Table 7.15, specifically the Magnitude for the aforementioned activities (0-1, negligible to minor), seems low especially given that Templeman 2007 states the EBSA's important coastal spawning and nursing areas in Placentia Bay are highly sensitive to disturbance.

7.7.3 Sensitive Areas VEC, pg. 467

The 11 sea cages overlap the sensitive area described in this EIS as being an area of high ichthyoplankton aggregation. The release of large numbers of fish in both the emergency case and worst case scenario in spring would coincide with the presence of ichthyoplankton for species such as Atlantic Cod, Capelin and American Plaice. This would be more for DFO's Science to comment on but predation by Lumpfish and Farmed Salmon introduced in these numbers could potentially affect ichthyoplankton concentrations.

Decker, Shelley

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 11:41 AM
To: Pilgrim, Bret; Decker, Shelley
Cc: Griffiths, Helen
Subject: grieg article

<http://www.thetelegram.com/business/nl-coalition-for-aquaculture-reform-seeking-more-time-to-comment-on-griegs-placentia-bay-aquaculture-project-222835/>

Roger Johnson
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s.16(2)(c)

Johnson, Roger

From: Ruddock, Stella D
Sent: Tuesday, July 3, 2018 1:40 PM
To: Johnson, Roger
Subject: Re: Grieg Aquaculture

OK. [REDACTED] and meeting with Helen on this tomorrow. I'll give you a call tomorrow.

Stella

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 07:50
To: Ruddock, Stella D
Cc: Pilgrim, Bret
Subject: Grieg Aquaculture

Could you call my cellphone when you get a chance.

I think we may need to consider doing up some reactive media lines for the Grieg Aquaculture EIS decision

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

s.19(1)

Johnson, Roger

From: Ruddock, Stella D
Sent: Tuesday, July 3, 2018 2:41 PM
To: Griffiths, Helen
Cc: Johnson, Roger
Subject: Re: FPP - update

OK.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 14:39
To: Ruddock, Stella D
Cc: Johnson, Roger
Subject: RE: FPP - update

I think Roger emailed you as well about this one, so I'll leave it to him. He can fill you in

From: Ruddock, Stella D
Sent: July-03-18 1:38 PM
To: Griffiths, Helen
Subject: Re: FPP - update

Hi Helen,

I'm back in the office tomorrow, and can pop up anytime.

Stella

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 09:25
To: Ruddock, Stella D
Subject: FPP - update

Hi Stella

I'm acting in FPP for a few weeks. Want to give you a heads-up on Grieg file. What time Tuesday or Wednesday is good for you?

Helen

Johnson, Roger

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 3:12 PM
To: Johnson, Roger
Subject: RE: Grieg Environmental Impact Statement

I agree. This cant be rushed. Just checking.
I'll chat with Tilman

From: Johnson, Roger
Sent: July-03-18 2:00 PM
To: Griffiths, Helen
Subject: RE: Grieg Environmental Impact Statement

I was hoping to have the final "product" in hand – we could put it off a day or so but this week is a non-starter if we want anything done more than just stapling the comments together – it is proving to be quite a bit of work and I want it done as well as possible to keep myself and my team looking OK. There is not much more now to brief Jackie with more than what we said Friday

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 1:12 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: FW: Grieg Environmental Impact Statement

Bit of an issue trying to brief Jackie on Grieg EIS comments next week. Is this week possible?

From: Butler, Annette
Sent: July-03-18 1:02 PM
To: Griffiths, Helen
Cc: Finn, Ray; Pike, Kelly J
Subject: RE: Grieg Environmental Impact Statement

Hi Helen,

The RDG's calendar next week Monday, Tuesday and possibly Wednesday and Thursday are booked solid. Would later this week work? If not it will have to be some time next Friday?

Annette

From: Griffiths, Helen
Sent: 2018-July-03 11:32 AM
To: Butler, Annette
Cc: Finn, Ray; Pike, Kelly J
Subject: Grieg Environmental Impact Statement

Hi Annette

Can we request an hr for a meeting with RDG on Monday July 9, please? We will have reviewed Science comments, as well as other sector comments, on Grieg EIS by then, and can provide an update/briefing. Can you include Barry, as well as Ray, Roger Johnson and myself, please?

Ray is booked for a meeting with DG of Aquaculture, Jean-Francois LaRue, on Monday morning?

Thanks

Helen

No information has been removed or severed from this page

Finn, Ray

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 3:36 PM
To: Butler, Annette
Cc: Finn, Ray; Pike, Kelly J
Subject: RE: Grieg Environmental Impact Statement

Hi Annette

Can you book an hr on Friday afternoon, preferably closer to end of day? We may be ready to discuss on Friday. I'll keep you posted in the event we have to cancel.

Thanks

Helen

From: Butler, Annette
Sent: July-03-18 1:02 PM
To: Griffiths, Helen
Cc: Finn, Ray; Pike, Kelly J
Subject: RE: Grieg Environmental Impact Statement

Hi Helen,

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Annette

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Cc: Finn, Ray; Pike, Kelly J
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Ray is booked for a meeting with DG of Aquaculture, Jean-Francois LaRue, on Monday morning?

Thanks

Helen

Johnson, Roger

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 3:48 PM
To: Johnson, Roger
Subject: RE: Grieg Environmental Impact Statement

Roger

I spoke with Tilman about this and because of RDGs schedule, I asked Annette to book off an hr late Friday afternoon, just so that we can highlight any issues. We DO NOT need a draft document for this meeting. I realize this is still cutting it close, but we don't have much options considering scheduling, and given the file that it is. If we're not ready to go on Friday, I'll ask to have the meeting cancelled.

Helen

From: Johnson, Roger
Sent: July-03-18 2:00 PM
To: Griffiths, Helen
Subject: RE: Grieg Environmental Impact Statement

I was hoping to have the final "product" in hand – we could put it off a day or so but this week is a non-starter if we want anything done more than just stapling the comments together – it is proving to be quite a bit of work and I want it done as well as possible to keep myself and my team looking OK. There is not much more now to brief Jackie with more than what we said Friday

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 1:12 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: FW: Grieg Environmental Impact Statement

Bit of an issue trying to brief Jackie on Grieg EIS comments next week. Is this week possible?

From: Butler, Annette
Sent: July-03-18 1:02 PM
To: Griffiths, Helen
Cc: Finn, Ray; Pike, Kelly J
Subject: RE: Grieg Environmental Impact Statement

Hi Helen,

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Annette

From: Griffiths, Helen
Sent: 2018-July-03 11:32 AM
To: Butler, Annette

Cc: Finn, Ray; Pike, Kelly J

Subject: Grieg Environmental Impact Statement

Hi Annette

Can we request an hr for a meeting with RDG on Monday July 9, please? We will have reviewed Science comments, as well as other sector comments, on Grieg EIS by then, and can provide an update/briefing. Can you include Barry, as well as Ray, Roger Johnson and myself, please?

Ray is booked for a meeting with DG of Aquaculture, Jean-Francois LaRue, on Monday morning?

Thanks

Helen

No information has been removed or severed from this page

Johnson, Roger

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 6:09 PM
To: Johnson, Roger
Subject: Re: Grieg EIS comments

[REDACTED] Let me know what works for u

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 6:07 PM
To: Griffiths, Helen
Subject: Re: Grieg EIS comments

If you could send me the dates you need me to act, I will run them [REDACTED] and Bret Re site visit plans

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 6:02 PM
To: Johnson, Roger
Subject: Re: Grieg EIS comments

And thank you for ur support as well!! Ur good work was acknowledged by Jackie on Friday!

I really appreciate all ur good work on all files!

I'm gonna ask someone else to do the PSES work, to give Shelley some breathing space, so she devote her time to Grieg file.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 5:56 PM
To: Griffiths, Helen
Subject: Re: Grieg EIS comments

s.19(1)

s.21(1)(b)

Thanks for the support on this. [REDACTED]

Hoping to meet with comm in am

Bret and Shelly [REDACTED]

Much bigger job than anticipated but Bret [REDACTED]
[REDACTED]

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen

Sent: Tuesday, July 3, 2018 5:48 PM
To: Johnson, Roger
Subject: Re: Grieg EIS comments

Ok, I'll tell Annette

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Tuesday, July 3, 2018 5:34 PM
To: Griffiths, Helen
Subject: Re: Grieg EIS comments

Agreed

As many of the comments come from his shop he should be there

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Tuesday, July 3, 2018 3:51 PM
To: Johnson, Roger
Subject: Grieg EIS comments

I think Ray, or someone, suggested on Friday at meeting with Jackie, that Barry should be included in follow-up meeting with Jackie to discuss draft comments? Yes?

Johnson, Roger

From: Johnson, Roger
Sent: Wednesday, July 4, 2018 4:12 PM
To: Pilgrim, Bret
Subject: Re: DFO Doc BBP.doc

Thanks man

[REDACTED]

When this goes in next week [REDACTED]

Heard anything on BI 3?

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Pilgrim, Bret
Sent: Wednesday, July 4, 2018 4:03 PM
To: Johnson, Roger
Subject: DFO Doc BBP.doc

Roger,

See attached the DRAFT departmental response to the Grieg Aquaculture Project. I also have it saved on the shared drive. We can tear this apart in the morning...however, [REDACTED]

Bret

s.19(1)

s.21(1)(b)

Johnson, Roger

From: Johnson, Roger
Sent: Thursday, July 5, 2018 8:05 AM
To: Decker, Shelley
Subject: FW: DFO Doc BBP.doc
Attachments: DFO Doc BBP.doc

From: Pilgrim, Bret
Sent: Wednesday, July 4, 2018 4:04 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: DFO Doc BBP.doc

Roger,

See attached the DRAFT departmental response to the Grieg Aquaculture Project. I also have it saved on the shared drive. We can tear this apart in the morning... [REDACTED]

Bret

s.19(1)
s.21(1)(b)



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July X, 2018

Our file Notre référence

Provincial contact

Dear Mr. X:

Re: *Review of the Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf Grieg NL on dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs).
- **Page xxxi. Assessment Boundaries.** The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species. Also, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.
- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.
- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true; most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please



provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

- **Page xxxiv. Control of Sea Lice.** Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.
- **Page xxxiv. Effects on Benthic Habitat.** *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).
- **Page xxxv. Fish and Fish Habitat VEC.** The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours.
- **Page xxxvi. Wild Atlantic Salmon VEC.** Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.
- **Page xxxvi.** Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.
- **Page xxxvii.** In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty. The concluding statement that residual effects were predicted to be not significant and do not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.
- **Page xxxviii. Sensitive Areas VEC.** It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.
- **Page xxxix. Accidents and Malfunctions.** Please provide references to support the statement that triploid female salmon do not enter freshwater.
- **Page xxxix. Follow-up Monitoring.** Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO.

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016).
- **Page 14.** *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur.



- **A sentence on p. 17** stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain.
- **Page 16.** *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern."* As stated previously, this may not apply to all BMAs.
- **Page 17.** The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.
- **Page 21.** It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland.
- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. If so, on what frequency or under what conditions, or is it only in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers.
- **Page 64.** From an Introduction and Transfers perspective and the genetic and ecological interactions of farmed Atlantic Salmon and wild Salmon, the applicant proposes the use of Triploid European-origin salmon. European-origin farmed salmon have never been utilized for these purposes in Newfoundland. The CSAS office is currently concluding a technical paper on the potential risks associated with this introduction and when published, it will further inform DFO and the applicant on the risks associated.
- Salmon aquaculture is well established as an industry in NL however, the use of triploids and European-origin stock will be a new introduction. While it's being considered under the EIS, the genetic and ecological impacts will be further assessed under the National Code on Introduction and Transfers. All legislative/regulatory reviews, authorization, and licensing requirements will have to be met as per usual for salmonid aquaculture.
- **Page 73.** *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.
- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc. is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.



Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.
- Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency.
- Page 92.** Other Mitigation Measures. What are the contents of an escape response kit?
- Page 92.** The recapture components identified are in agreement with requirements under the Code of Containment for the Culture of Salmonids in Newfoundland and Labrador.
- Page 96.** Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

- Several times in the document, there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions.* If such distances were mandated, there would not be an existing salmon aquaculture industry on the South Coast.
- Page 99.** *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue.
- Page 100.** *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."* These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.
- Page 101.** The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon.



- **Page 107.** The EIS states "*In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene*". The statement is incorrect. Security breaches will be handled by the RCMP.

Section 2.8. Accidents and Malfunctions

- **Page 123.** The EIS highlight gear breaking free and becoming a navigational hazard and a source of entanglement with other fishing gear. Other source of entanglement omitted from this section is entanglement with marine mammals and sea turtles. Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail.

Section 3.0. Effects Assessment Methodology

- **Page 130.** Study Area. It states that "*The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA*" and that "*This is considered the maximum extent wherein there is potential for effects of the Project to occur...*" Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

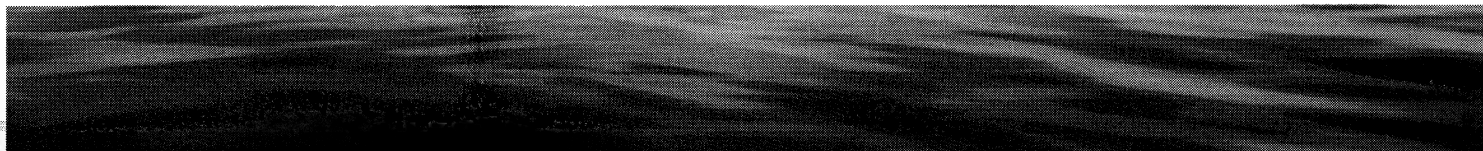
Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented.
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.
- **Page 140.** Wind rose(s) should be added to illustrate the statement "*The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer.*" The sentence "*The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter*" is unclear. Please revisit and clarify.
- **Page 141.** "A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period." A reference should be provided for this statement.

4.2.2. Physical Environment

- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: "*Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important.*" This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of



data (i.e. spring and neap cycle in Newfoundland wind forcing and the Labrador Current are variable on timescales of days to seasons [or more]); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site.

- **Page 144.** Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.
- **Page 145.** Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.
- **Page 160.** Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if there were collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an



aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.
- **Page 170.** Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.3. *Wild Atlantic Salmon*

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as “threatened.” COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.
- **Page 174.** Migratory Patterns. Remove reference to Atlantic Salmon spending ‘several months’ in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.
- **Page 175.** The document states “*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*” yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.
- **Page 175.** Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

4.4.2.3. *Domestic Fisheries in the Study Area*

- **Page 208.** The statement “currently there is a shift back to a groundfish-based fishery (Fig. 4.17).” This statement is not clear from figure referenced. It’s recommended to add other supporting literature.
- **Page 224.** to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); to what magnitude?
- **Page 228.** “...and quota adjustments in areas that show a flux in population demographics.” This statement could be clarified.

4.4.2.3. *Domestic Fisheries in the Study Area*

- **Page 251.** Are there are recent data for primary product value for muscles post 2007.

4.8. *Data Gaps*

- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.



Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited.
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.
- **Page 359.** Table 7.3 (and page 377, Table 7.6). The tables report that the potential for negative environmental effects is not significant, but the Proponent has assigned a medium level of confidence throughout these tables. A medium level of confidence would indicate that the risk of each outcome cannot be in fact "not significant."
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.
- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.
- **Page 363.** "It is important to consider all of these visual indicators when assessing for impacts of aquaculture since *Beggiatoa* mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)." They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time period are should be identified as *minimum* fallowing times.
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p. 370).
- **Page 371.** Production of Waste Materials. There is no integration of existing information about the local environment, or other aquaculture sites.

Section 7.2. Wild Salmon VEC

- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Section 7.3.3 & 7.3.3. Marine Mammals & Sea Turtles



- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. The same can be said for table 7.12 and 7.13.

Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1. highlights potential interactions with lights and fish and fish habitat. However, this is excluded in table 7.14

Section 7.7. Accidents and Malfunctions

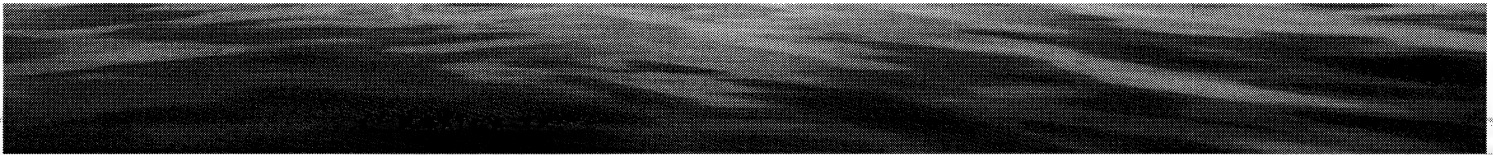
- **Page 434.** The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.
- **Page 435.** *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.
- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.
- **Page 436.** There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys.

Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions,
- **Page 476.** Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

Section 7.9.2. Accidents and Malfunctions

- **Page 480.** It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, at best it would be low.



Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.
- **Page 4, Para. 2.** Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).
- **Page 15, Para. 2.** It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past two consecutive years, which has not been seen since the commercial moratorium in 1992.
- **Page 17.** Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.
- **Page 36.** It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey."* This was not mentioned and discussed in the main EIS document.
- **Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon.** The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river. However, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.
- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.
- **Page 56.** Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

- The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again, data are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

- **Page 31.** It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.



- **Page 32, Para. 1.** The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.
- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.
- **Page 32, Para. 5.** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.
- **Page 32, Para. 6.** Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible.' Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).
- **Page 33.** Appendix 8 appears to be missing.

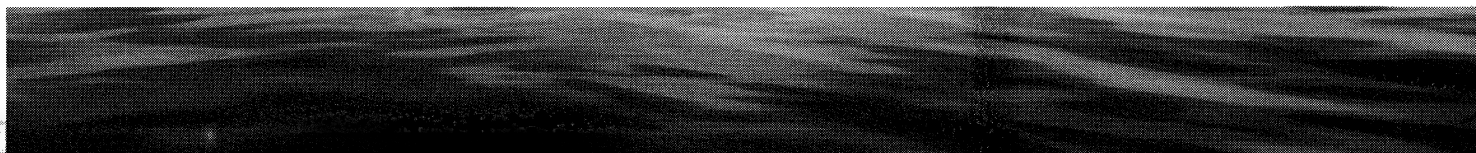
Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.
- **Page 49.** *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."* However, only measurements at one point for each site are reported.

Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste,"* which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

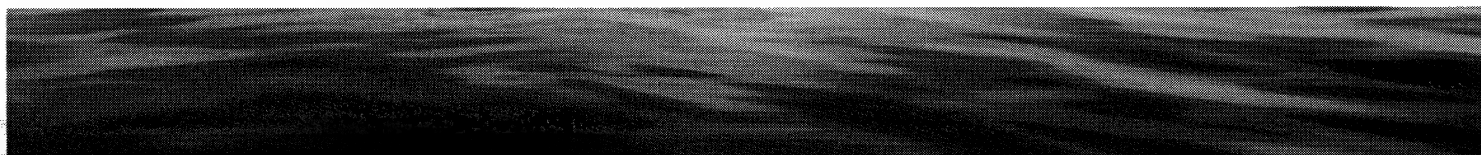
- The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping 20 hours to a few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tide is a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available



dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).
- **Page 5.** Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.
- **Page 28.** *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).
- **Page 36.** *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* Information on the tidal analysis results is required.
- **Page 36.** *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*
- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).
- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.
- **Page 45.** As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented are even less reliable. The dataset used should be clearly stated and described (resolution and limitations).
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.



Thank you for providing the opportunity to review and provide comment on this project EA Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.6105) or email (roger.johnson@dfo-mpo.gc.ca.).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch

Johnson, Roger

From: Decker, Shelley
Sent: Thursday, July 5, 2018 4:09 PM
To: Johnson, Roger; Pilgrim, Bret
Subject: EIS Response Review

I reviewed our response to the Environmental Impact Assessment, couple minor corrections required:

4.4.2.3, page 224 (second bullet) should read “does” not “dies”

4.4.2.3, page 251 (first bullet) should read “mussels”, not “muscles”

Shelley

Shelley Decker

Fisheries Protection Biologist - Standards and Guidelines
Fisheries Protection Program, Ecosystems Management Branch
Northwest Atlantic Fisheries Centre
Fisheries and Oceans Canada
80 East White Hills Road, PO Box 5667
St. John's, NL, A1C 5X1
Shelley.Decker@dfo-mpo.gc.ca
Telephone (709) 772-6174
Government of Canada

Finn, Ray

From: Griffiths, Helen
Sent: Thursday, July 5, 2018 4:57 PM
To: Finn, Ray
Subject: Re: Grieg update

That sounds better!! Science comments nested into other sector comments to make one coherent set from DFO.

Ok, I'll see if I can get JF on the phone tomorrow to give him an update on where we are with this file.

Thank you!! :)

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Finn, Ray
Sent: Thursday, July 5, 2018 4:52 PM
To: Griffiths, Helen
Subject: Re: Grieg update

Given the time sensitivity please proceed in my absence.

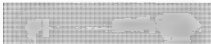
On the "massaging" element we need to re frame - in other words the Science comments stand on their "two legs". Our task as it has always been is to operationalize the science commentary into a DFO position on the state of the EIS and it's conformity or lack thereof with the provincial guidelines issued to the proponent.

The Science comments need to be "nested into" a coherent set of comments that represent DFO at large.

Ps - given we have keep JF LaRue in the loop on this you might consider a short call with him - not to seek his approval - on the contrary but simply to keep him apprised as the functional DG.

Does this help a little?

Ray

 (cell)
(709) 772 - 2442. (office)

Sent via Blackberry

From: Griffiths, Helen
Sent: Thursday, July 5, 2018 3:56 PM
To: Finn, Ray
Subject: Grieg update

Hi

As follow-up from last Friday meeting with Jackie on Grieg file, I tried to book another meeting with her for Monday when you would be back in the office (to brief her on all DFO comments). However, Annette said Jackie is completely booked Monday-Wednesday and likely another full day Thursday. Comments are due back to EA Committee Chair July 12. So our only option is latter part of this week, i.e. tomorrow, and I'm acting for you tomorrow. I went ahead and booked tomorrow 3-4pm with Jackie, Barry, Roger and myself.

Roger and his crew have finished reviewing EIS document and all sector comments, and have compiled all comments in a nice neat package. As he indicated in meeting last week, he would go through Science comments and 'massage' them (not change them, as CSAS report will be available online) as needed before incorporating them into report he will send to Chair. I suggested he send the draft comments/report to you, Barry and Jackie before tomorrow's meeting. He said there's nothing in there that's a show stopper, just identifying gaps, deficiencies, asking for clarification. He did make a comment today when I met with him about possibility of Science not agreeing with him massaging/refining their comments (from the CSAS process they held last Monday)...

Do you want us to proceed with meeting tomorrow?? I told Roger not to send anything until he hears back from me, after I hear back from you! ☺

Johnson, Roger

From: Griffiths, Helen
Sent: Thursday, July 5, 2018 5:07 PM
To: Johnson, Roger
Subject: Re: Grieg update

Email back from Ray. He wants us to go ahead with meeting tomorrow, so u can send document to Barry Jackie and Ray first thing am.
Thanks Roger! Much appreciated

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Thursday, July 5, 2018 1:34 PM
To: Johnson, Roger
Subject: Re: Grieg update

At Bob Gregory ppt. I'll leave at 2 to join u

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Thursday, July 5, 2018 1:25 PM
To: Griffiths, Helen
Subject: Grieg update

Bret, Shelly and myself are meeting in the small boardroom from 1330 -1430 to polish our comments if you would like to drop in we can discuss next steps

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Johnson, Roger
Sent: Friday, July 6, 2018 9:55 AM
To: Griffiths, Helen
Subject: RE: Grieg Aquaculture

Perhaps we should – if only briefly

From: Griffiths, Helen
Sent: Friday, July 6, 2018 9:48 AM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

Are we still meeting at 10?

From: Johnson, Roger
Sent: July-06-18 9:40 AM
To: Finn, Ray; Griffiths, Helen; Perry, Jacqueline; McCallum, Barry
Cc: Butler, Annette; Pilgrim, Bret; Decker, Shelley
Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

While I encourage comments and will incorporate all important changes you may want I must stress that the deadline for submission to the province is next week so it will be difficult to incorporate any sweeping changes/directions due to limited time.

I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Grant, Carole

From: Grant, Carole
Sent: Friday, July 6, 2018 10:32 AM
To: Dempson, Brian; Bradbury, Ian R
Subject: Fw: Grieg Aquaculture
Attachments: DFO Doc BBP.doc

Brian/Ian,

Please review the attached and ensure all our major concerns have been incorporated. Need this ASAP.

Thanks
Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:52 AM
To: Grant, Carole; Davis, Ben
Subject: FW: Grieg Aquaculture

fyi

From: Johnson, Roger
Sent: Friday, July 6, 2018 9:40 AM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>; Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>; McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>
Cc: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: Grieg Aquaculture

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In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

While I encourage comments and will incorporate all important changes you may want I must stress that the deadline for submission to the province is next week so it will be difficult to incorporate any sweeping changes/directions due to limited time.

I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson

Sr. Biologist - Mining

Fisheries Protection Program

Dept. of Fisheries and Oceans

Telephone: (709)772-3296 (O) [REDACTED] (cell)

s.16(2)(c)

E-mail: Roger.Johnson@dfo-mpo.gc.ca

No further information has been removed or severed from this page



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 12, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

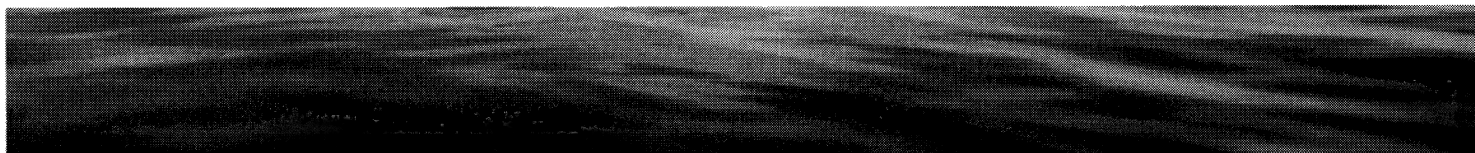
Dear Ms. Squires:

Re: *Review of the Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf Grieg NL on dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs).
- **Page xxxi. Assessment Boundaries.** The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species. Also, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.
- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

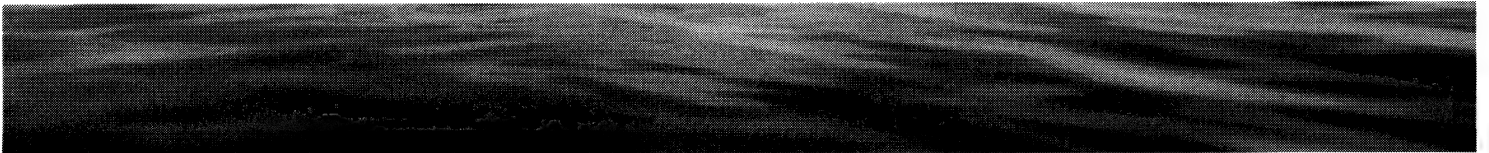


- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true; most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them.
- **Page xxxiv. Control of Sea Lice.** Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.
- **Page xxxiv. Effects on Benthic Habitat.** *“Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom).”* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are “not significant.” (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).
- **Page xxxv.** Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours.
- **Page xxxvi.** Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.
- **Page xxxvi.** Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.
- **Page xxxvii.** In the first paragraph, it states that effects are expected *“to be minor, localized and relatively short-term”*. This is not known and the statement does not reflect the large amount of uncertainty. The concluding statement that residual effects were predicted to be not significant and do not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.
- **Page xxxviii.** Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.
- **Page xxxix.** Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.
- **Page xxxix.** Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO.

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016).
- **Page. 14.** *“Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon.”* This is encouraging, but until triploids are fully



- investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur.
- **Page 16.** The dissolved oxygen (DO) values to apply to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a potential concern and use of these sites should be reevaluated.
 - **A sentence on p. 17** stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain.
 - **Page 17.** The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.
 - **Page 21.** It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland.
- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. If so, on what frequency or under what conditions, or is it only in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers.
- **Page 64.** From an Introduction and Transfers perspective and the genetic and ecological interactions of farmed Atlantic Salmon and wild Salmon, the applicant proposes the use of Triploid European-origin salmon. European-origin farmed salmon have never been utilized for these purposes in Newfoundland. The CSAS office is currently concluding a technical paper on the potential risks associated with this introduction and when published, it will further inform DFO and the applicant on the risks associated.
- Salmon aquaculture is well established as an industry in NL however, the use of triploids and European-origin stock will be a new introduction. While it's being considered under the EIS, the genetic and ecological impacts will be further assessed under the National Code on Introduction and Transfers. All legislative/regulatory reviews, authorization, and licensing requirements will have to be met as per usual for salmonid aquaculture.
- **Page 73.** *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.



- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc. is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.
- **Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency.
- **Page 92.** Other Mitigation Measures. What are the contents of an escape response kit?
- **Page 92.** The recapture components identified are in agreement with requirements under the Code of Containment for the Culture of Salmonids in Newfoundland and Labrador.
- **Page 96.** Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

- Several times in the document, there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions.* If such distances were mandated, there would not be an existing salmon aquaculture industry on the South Coast.
- **Page 99.** *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue.
- **Page 100.** *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."* These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation



between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

- **Page 101.** The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon.
- **Page 107.** The EIS states "*In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene*". The statement is incorrect. Security breaches will be handled by the RCMP.

Section 2.8. Accidents and Malfunctions

- **Page 123.** The EIS highlight gear breaking free and becoming a navigational hazard and a source of entanglement with other fishing gear. Other source of entanglement omitted from this section is entanglement with marine mammals and sea turtles. Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail.

Section 3.0. Effects Assessment Methodology

- **Page 130.** Study Area. It states that "*The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA*" and that "*This is considered the maximum extent wherein there is potential for effects of the Project to occur...*" Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented.
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.
- **Page 140.** Wind rose(s) should be added to illustrate the statement "*The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer.*" The sentence "*The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter*" is unclear. Please revisit and clarify.
- **Page 141.** "A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period." A reference should be provided for this statement.

4.2.2. Physical Environment

- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area,



published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: “*Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important.*” This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of data (i.e. spring and neap cycle in Newfoundland wind forcing and the Labrador Current are variable on timescales of days to seasons [or more]); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site.

- **Page 144.** Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.
- **Page 145.** Flood and Tidal Zones. “*During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.*” A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.
- **Page 160.** Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if there were collected, and it was not discussed in the report.



3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.
- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.
 - **Page 170.** Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.3. Wild Atlantic Salmon

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.
- **Page 174.** Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.
- **Page 175.** The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.
- **Page 175.** Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon.

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 208.** The statement "currently there is a shift back to a groundfish-based fishery (Fig. 4.17)." This statement is not clear from figure referenced. It's recommended to add other supporting literature.
- **Page 224.** to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); to what magnitude?
- **Page 228.** "...and quota adjustments in areas that show a flux in population demographics." This statement should be clarified.

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 251.** Are there are recent data for primary product value for muscles post 2007.

4.8. Data Gaps

- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and



chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. “Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).” The correlation could not be found in the document cited.
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.
- **Page 359.** Table 7.3 (and page 377, Table 7.6). The tables report that the potential for negative environmental effects is not significant, but the Proponent has assigned a medium level of confidence throughout these tables. A medium level of confidence would indicate that the risk of each outcome cannot be “not significant.”
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.
- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.
- **Page 363.** “It is important to consider all of these visual indicators when assessing for impacts of aquaculture since *Beggiatoa* mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016).” They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time period are should be identified as *minimum* fallowing times.
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of ‘acceptable’ organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p. 370).
- **Page 371.** Production of Waste Materials. There is no integration of existing information about the local environment, or other aquaculture sites.

Section 7.2. Wild Salmon VEC



- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Section 7.3.3 & 7.3.3. Marine Mammals & Sea Turtles

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. The same can be said for table 7.12 and 7.13.

Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1. highlights potential interactions with lights and fish and fish habitat. However, this is excluded in table 7.14

Section 7.7. Accidents and Malfunctions

- **Page 434.** The document states: *“Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit.”* It would be useful for the reader if these other attributes were described. It also states that *“since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon.”* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.
- **Page 435.** *“Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.”* This will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.
- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.
- **Page 436.** There is a reference to Verspoor et al. (2015), which states that *“smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks.”* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement “older individuals” is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d’Espoir in the fall 2017 surveys.

Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions,
- **Page 476.** Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

Section 7.9.2. Accidents and Malfunctions



- **Page 480.** It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, especially for a complete cage breach.

Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.
- **Page 4, Para. 2.** Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).
- **Page 15, Para. 2.** It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past two consecutive years, which has not been seen since the commercial moratorium in 1992.
- **Page 17.** Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.
- **Page 36.** It states that "*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*" and that this could affect migration patterns if wild salmon "*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey.*" This was not mentioned and discussed in the main EIS document.
- **Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon.** The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river. However, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.
- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.
- **Page 56.** Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.
- Consultations between Grieg NL and Fisheries and Oceans Canada are currently ongoing

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

- The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure).

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

- **Page 31.** It states that "*if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are*



implemented." This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

- **Page 32, Para. 1.** The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.
- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.
- **Page 32, Para. 5.** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.
- **Page 32, Para. 6.** Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible.' Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).
- **Page 33.** Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.
- **Page 36.** Two of the marine sites - Gallows Harbour and Ship Island – have been identified as predominately (50%<) soft bottom substrates and monitoring completed as part of this proposal does not meet the standard for soft bottom substrates, additional monitoring will be required. This can be further obtained as part of the subsequent, provincially-led site licensing review process.
- **Page 49.** *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."* However, only measurements at one point for each site are reported.

Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste,"* which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.



Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

- The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping 20 hours to a few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tide is a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).
- **Page 5.** Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.
- **Page 28.** *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).
- **Page 36.** *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* Information on the tidal analysis results is required.
- **Page 36.** *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*
- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).



- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although it's long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.
- **Page 45.** As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented are even less reliable. The dataset used should be clearly stated and described (resolution and limitations).
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.

Thank you for providing the opportunity to review and provide comment on this project EA Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

White, Terrena

From: Dempson, Brian
Sent: July-06-18 11:09 AM
To: Grant, Carole; Bradbury, Ian R
Subject: RE: Grieg Aquaculture
Attachments: DFO Doc BBP - BD.doc

Carole

A few minor editorial suggestions.

B

J. Brian Dempson

Fisheries and Oceans Canada
Science Branch
80 East White Hills Road
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Phone: (709) 772-7989 (** NEW Phone # **)
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From: Grant, Carole
Sent: 2018-July-06 10:32 AM
To: Dempson, Brian; Bradbury, Ian R
Subject: Fw: Grieg Aquaculture

Brian/Ian,

Please review the attached and ensure all our major concerns have been incorporated. Need this ASAP.

Thanks
Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:52 AM
To: Grant, Carole; Davis, Ben
Subject: FW: Grieg Aquaculture

fyi

From: Johnson, Roger

Sent: Friday, July 6, 2018 9:40 AM

To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>; Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>; McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>

Cc: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>

Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

While I encourage comments and will incorporate all important changes you may want I must stress that the deadline for submission to the province is next week so it will be difficult to incorporate any sweeping changes/directions due to limited time.

I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson

Sr. Biologist - Mining

Fisheries Protection Program

Dept. of Fisheries and Oceans

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Fisheries and Oceans
Canada

Pêches et Océans
Canada



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 12, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf Grieg NL on dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs).
- **Page xxxi. Assessment Boundaries.** The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species. Also, there is good scientific evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it is seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.
- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

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- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true; most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them.
- **Page xxxiv. Control of Sea Lice.** Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.
- **Page xxxiv. Effects on Benthic Habitat.** *“Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom).”* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are “not significant.” (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).
- **Page xxxv.** Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours.
- **Page xxxvi.** Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.
- **Page xxxvi.** Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.
- **Page xxxvii.** In the first paragraph, it states that effects are expected *“to be minor, localized and relatively short-term”*. This is not known and the statement does not reflect the large amount of uncertainty. The concluding statement that residual effects were predicted to be not significant and do not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.
- **Page xxxviii.** Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.
- **Page xxxix.** Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.
- **Page xxxix.** Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO.

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016).
- **Page. 14.** *“Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon.”* This is encouraging, but until triploids are fully



investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur.

- **Page 16.** The dissolved oxygen (DO) values ~~to apply~~ to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a potential concern and use of these sites should be reevaluated.
- **A sentence on p. 17** stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain.
- **Page 17.** The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.
- **Page 21.** It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland.
- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. If so, on what frequency or under what conditions, or is it only in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers.
- **Page 64.** From an Introduction and Transfers perspective and the genetic and ecological interactions of farmed Atlantic Salmon and wild Salmon, the applicant proposes the use of Triploid European-origin salmon. European-origin farmed salmon have never been utilized for these purposes in Newfoundland. The CSAS office is currently concluding a technical paper on the potential risks associated with this introduction and when published, it will further inform DFO and the applicant on the risks associated.
- Salmon aquaculture is well established as an industry in NL however, the use of triploids and European-origin stock will be a new introduction. While it's being considered under the EIS, the genetic and ecological impacts will be further assessed under the National Code on Introduction and Transfers. All legislative/regulatory reviews, authorization, and licensing requirements will have to be met as per usual for salmonid aquaculture.
- **Page 73.** *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.



- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc. is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.
- **Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency.
- **Page 92.** Other Mitigation Measures. What are the contents of an escape response kit?
- **Page 92.** The recapture components identified are in agreement with requirements under the Code of Containment for the Culture of Salmonids in Newfoundland and Labrador.
- **Page 96.** Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

- Several times in the document, there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30 km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions.* If such distances were mandated, there would not be an existing salmon aquaculture industry on the South Coast.
- **Page 99.** *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue.
- **Page 100.** *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."* These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation



between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

- **Page 101.** The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon.
- **Page 107.** The EIS states *"In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene"*. The statement is incorrect. Security breaches will be handled by the RCMP.

Section 2.8. Accidents and Malfunctions

- **Page 123.** The EIS highlight gear breaking free and becoming a navigational hazard and a source of entanglement with other fishing gear. Other source of entanglement omitted from this section is entanglement with marine mammals and sea turtles. Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail.

Section 3.0. Effects Assessment Methodology

- **Page 130.** Study Area. It states that *"The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA"* and that *"This is considered the maximum extent wherein there is potential for effects of the Project to occur..."* Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented.
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.
- **Page 140.** Wind rose(s) should be added to illustrate the statement *"The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer."* The sentence *"The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter"* is unclear. Please revisit and clarify.
- **Page 141.** *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

4.2.2. Physical Environment

- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area,



published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of data (i.e. spring and neap cycle in Newfoundland wind forcing and the Labrador Current are variable on timescales of days to seasons [or more]); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site.

- **Page 144.** Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.
- **Page 145.** Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.
- **Page 160.** Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if there were collected, and it was not discussed in the report.



3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.
- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.
 - **Page 170.** Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.3. Wild Atlantic Salmon

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.
- **Page 174.** Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.
- **Page 175.** The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.
- **Page 175.** Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon.

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 208.** The statement "currently there is a shift back to a groundfish-based fishery (Fig. 4.17)." This statement is not clear from figure referenced. It's recommended to add other supporting literature.
- **Page 224.** to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); to what magnitude?
- **Page 228.** "...and quota adjustments in areas that show a flux in population demographics." This statement should be clarified.

Commented [D1]: Format – Most/all other bullet statements have been separated by a space. Should this be done here as well?

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 251.** Are there are recent data for primary product value for muscles post 2007.

4.8. Data Gaps

- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and



chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. *"Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)."* The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.
- **Page 359.** Table 7.3 (and page 377, Table 7.6). The tables report that the potential for negative environmental effects is not significant, but the Proponent has assigned a medium level of confidence throughout these tables. A medium level of confidence would indicate that the risk of each outcome cannot be "not significant."
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.
- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.
- **Page 363.** *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time period are should be identified as *minimum* fallowing times.
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p. 370).
- **Page 371.** Production of Waste Materials. There is no integration of existing information about the local environment, or other aquaculture sites.



Section 7.2. Wild Salmon VEC

- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Section 7.3.3 & 7.3.3. Marine Mammals & Sea Turtles

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. The same can be said for table 7.12 and 7.13.

Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1. highlights potential interactions with lights and fish and fish habitat. However, this is excluded in table 7.14

Section 7.7. Accidents and Malfunctions

- **Page 434.** The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.
- **Page 435.** "Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon." This will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes, but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.
- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.
- **Page 436.** There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys.

Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.
- **Page 476.** Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

Section 7.9.2. Accidents and Malfunctions

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- **Page 480.** It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, especially for a complete cage breach.

Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.
- **Page 4, Para. 2.** Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).
- **Page 15, Para. 2.** It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past two consecutive years, which has not been seen since the commercial moratorium in 1992.
- **Page 17.** Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.
- **Page 36.** It states that "*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*" and that this could affect migration patterns if wild salmon "*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey.*" This was not mentioned and discussed in the main EIS document.
- **Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon.** The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river. However, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.
- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.
- **Page 56.** Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.
- Consultations between Grieg NL and Fisheries and Oceans Canada are currently ongoing

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

- The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure).

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

- **Page 31.** It states that "*if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are*

Commented [D2]: Format - In places, quoted statements are often shown in "*italics*" with double quotation marks. Should italics and double quotes be used here? This happens in other areas as well.



implemented." This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

- **Page 32, Para. 1.** The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.
- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.
- **Page 32, Para. 5.** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.
- **Page 32, Para. 6.** Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible.' Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).
- **Page 33.** Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.
- **Page 36.** Two of the marine sites - Gallows Harbour and Ship Island – have been identified as predominately (50%+) soft bottom substrates and monitoring completed as part of this proposal does not meet the standard for soft bottom substrates, additional monitoring will be required. This can be further obtained as part of the subsequent, provincially-led site licensing review process.
- **Page 49.** *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."* However, only measurements at one point for each site are reported.

Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste,"* which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.



Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

- The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping 20 hours to a few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tide is a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).
- **Page 5.** Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.
- **Page 28.** *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).
- **Page 36.** *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* Information on the tidal analysis results is required.
- **Page 36.** *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*
- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).



Fisheries and Oceans
Canada

Pêches et Océans
Canada

- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although it's long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.
- **Page 45.** As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented are even less reliable. The dataset used should be clearly stated and described (resolution and limitations).
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.

Thank you for providing the opportunity to review and provide comment on this project EA Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca.).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Canada

Grant, Carole

From: Grant, Carole
Sent: Friday, July 6, 2018 12:02 PM
To: Dempson, Brian
Subject: RE: Grieg Aquaculture

I think it should.

From: Dempson, Brian
Sent: July-06-18 11:45 AM
To: Grant, Carole
Subject: RE: Grieg Aquaculture

Carole

Should this response also provide a list of references that were cited?

Brian

J. Brian Dempson

Fisheries and Oceans Canada
Science Branch
80 East White Hills Road
P. O. Box 5667
St. John's, NL A1C 5X1

Phone: (709) 772-7989 (** NEW Phone # **)
FAX: (709) 772-4188
E-mail: brian.dempson@dfo-mpo.gc.ca

From: Grant, Carole
Sent: 2018-July-06 10:32 AM
To: Dempson, Brian; Bradbury, Ian R
Subject: Fw: Grieg Aquaculture

Brian/Ian,

Please review the attached and ensure all our major concerns have been incorporated. Need this ASAP.

Thanks
Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:52 AM
To: Grant, Carole; Davis, Ben
Subject: FW: Grieg Aquaculture

fyi

From: Johnson, Roger

Sent: Friday, July 6, 2018 9:40 AM

To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>; Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>; McCallum, Barry <Barry.McCallum@dfo-mpo.gc.ca>

Cc: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>

Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

While I encourage comments and will incorporate all important changes you may want I must stress that the deadline for submission to the province is next week so it will be difficult to incorporate any sweeping changes/directions due to limited time.

I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson

Sr. Biologist - Mining

Fisheries Protection Program

Dept. of Fisheries and Oceans

Telephone: (709)772-3296 (O) [REDACTED] (cell)

E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Hendry, Christopher
Sent: Friday, July 6, 2018 12:35 PM
To: Johnson, Roger; Griffiths, Helen
Subject: RE: DRAFT FOR REVIEW: Media Lines - EA

I think it would be worthwhile to include a line speaking to the subsequent regulatory processes.

- Upon completion of the current Environmental Assessment process, the proponent will still be subject to subsequent regulatory approvals for aquaculture site licenses and introductions and transfers, both of which will involve DFO

Will there be a spokesperson identified for this?

From: Johnson, Roger
Sent: July-06-18 12:27 PM
To: Griffiths, Helen; Hendry, Christopher
Subject: Fw: DRAFT FOR REVIEW: Media Lines - EA

Any comments

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Ruddock, Stella D <Stella.Ruddock@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 12:22 PM
To: Johnson, Roger
Subject: DRAFT FOR REVIEW: Media Lines - EA

Hi Roger,

Please see below as discussed. These are based on preliminary information, and we can add additional detail about our recommendations, etc., as we go. Please let me know if there's other information we should add at this point. Also if you'd like to make any changes or clarifications.

I'm available this afternoon; let me know if you'd like to discuss further.

Thanks,
Stella

Anticipatory Media Lines Environmental assessment of Grieg's proposed operation in Placentia Bay

Issue

In 2015, Grieg NL registered plans to expand aquaculture operations into Placentia Bay. In 2016, the provincial Department of Environment and Conservation (now known as Municipal Affairs and Environment) released the undertaking from further environmental assessment. The release was challenged in court, resulting in a court-ordered Environmental Impact Statement (EIS). As per normal Environmental Assessment (EA) process, DFO has been asked to provide advice to the EA Committee.

Strategic Considerations and Public Environment

- Grieg's proposed expansion of operations into Placentia Bay has been under intense media scrutiny from the beginning due to criticism from anti-aquaculture groups.
- Some disapproval may be redirected to DFO due to its regulatory role in the risk assessment process.
- The South Newfoundland population of Atlantic Salmon has been assessed under COSEWIC as "threatened." This may add to concerns about the effects Grieg's activities on wild salmon.

Recommendation

These media lines are anticipatory and will be used if we receive a media inquiry related to DFO's role in the EIS process. Aquaculture is a provincial lead; therefore, media will be referred to them for questions outside of DFO's area of responsibility.

Media lines (Responsive)

- DFO has an advisory role in Environment Assessment (EA) processes. In the case of aquaculture operations, we review the registration materials and provide advice to the EA Committee relevant to our mandate. Our recommendations are based on whether there is sufficient information to enable us to address DFO's regulatory role in protecting fish and fish habitat.
- DFO also ensures the application of the *Fisheries Act* to activities that may cause serious harm to commercial, recreational and aboriginal fisheries and fish that support these fisheries.
- While DFO's responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management, approval of the aquaculture project itself lies with the Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information.

Stella Ruddock
Communications Advisor (Ecosystems Management)
Newfoundland and Labrador Region
Fisheries and Oceans Canada/Government of Canada
Stella.Ruddock@dfo-mpo.gc.ca/ Tel: 709-772-7630
Media Inquiries: Media.NL@dfo-mpo.gc.ca/ Tel: 709-772-3375

Follow us on Twitter! @DFO_NL

Johnson, Roger

From: Griffiths, Helen
Sent: Friday, July 6, 2018 12:50 PM
To: Johnson, Roger
Subject: Re: DRAFT FOR REVIEW: Media Lines - EA

Perfect. Then we can tell them this pm that we sent for their review :)

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Friday, July 6, 2018 12:48 PM
To: Griffiths, Helen
Subject: Re: DRAFT FOR REVIEW: Media Lines - EA

Good catch will do now

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Friday, July 6, 2018 12:46 PM
To: Johnson, Roger
Subject: Re: DRAFT FOR REVIEW: Media Lines - EA

I'll have a look when I get back.

Just remembered.....did u send comments to Carole and Chris for review?

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Friday, July 6, 2018 12:27 PM
To: Griffiths, Helen; Hendry, Christopher
Subject: Fw: DRAFT FOR REVIEW: Media Lines - EA

Any comments

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Ruddock, Stella D <Stella.Ruddock@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 12:22 PM
To: Johnson, Roger
Subject: DRAFT FOR REVIEW: Media Lines - EA

Hi Roger,

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I'm available this afternoon; let me know if you'd like to discuss further.

Thanks,

Anticipatory Media Lines

Environmental assessment of Grieg's proposed operation in Placentia Bay

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Recommendation

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Media lines (Responsive)

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- While DFO's responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management, approval of the aquaculture project itself lies with the Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information.

Stella Ruddock
Communications Advisor (Ecosystems Management)
Newfoundland and Labrador Region
Fisheries and Oceans Canada/Government of Canada
Stella.Ruddock@dfo-mpo.gc.ca / Tel: 709-772-7630
Media Inquiries: Media.NL@dfo-mpo.gc.ca / Tel: 709-772-3375

Follow us on Twitter! @DFO_NL

White, Terrena

From: Johnson, Roger
Sent: July-06-18 12:51 PM
To: Hendry, Christopher; Grant, Carole
Subject: Fw: Grieg Aquaculture
Attachments: DFO Doc BBP.doc

FYI

Can discuss if required

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:39 AM
To: Finn, Ray; Griffiths, Helen; Perry, Jacqueline; McCallum, Barry
Cc: Butler, Annette; Pilgrim, Bret; Decker, Shelley
Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

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I trust this document will meet with your expectations.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

**Pages 961 to / à 973
are duplicates of
sont des duplicatas des
pages 926 to / à 938**

White, Terrena

From: Hendry, Christopher
Sent: July-06-18 1:15 PM
To: Johnson, Roger; Grant, Carole
Subject: RE: Grieg Aquaculture

Thanks, Roger. Some general comments. We can discuss some specific comments separately.

- The response includes a number of suggested references, but these do not appear. Should these be included?
- There are a number of comments relating to transfer of disease to wild salmon. Wild fish health surveillance, federally, is the mandate of the Canadian Food Inspection Agency. On-farm fish health surveillance is the mandate of the Province.
- Relating to the geographic scope beyond the Placentia Bay EBSA, it was mentioned at the CSAS meeting that recent information showed evidence of disease transmission from farmed fish to wild fish at far distances from farms. Is this publication available?

From: Johnson, Roger
Sent: July-06-18 12:51 PM
To: Hendry, Christopher; Grant, Carole
Subject: Fw: Grieg Aquaculture

FYI

Can discuss if required

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:39 AM
To: Finn, Ray; Griffiths, Helen; Perry, Jacqueline; McCallum, Barry
Cc: Butler, Annette; Pilgrim, Bret; Decker, Shelley
Subject: Grieg Aquaculture

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I trust this document will meet with your expectations.

Roger Johnson

Sr. Biologist - Mining

Fisheries Protection Program

Dept. of Fisheries and Oceans

Telephone: (709)772-3296 (O) [REDACTED] (cell)

s.16(2)(c)

E-mail: Roger.Johnson@dfo-mpo.gc.ca

No further information has been removed or severed from this page

White, Terrena

From: Bradbury, Ian R
Sent: July-06-18 3:46 PM
To: Grant, Carole
Attachments: DFO_Doc_BBP-BD-IRB.doc



Fisheries and Oceans
Canada

Pêches et Océans
Canada

P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 12, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf Grieg NL on dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs).
- **Page xxxi. Assessment Boundaries.** The boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species. Also, there is good scientific evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Therefore, it is seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.
- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Canada



- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, the opposite is true; most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them.
- **Page xxxiv. Control of Sea Lice.** Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.
- **Page xxxiv. Effects on Benthic Habitat.** *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).
- **Page xxxv.** Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours.
- **Page xxxvi.** Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.
- **Page xxxvi.** Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.
- **Page xxxvii.** In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty. The concluding statement that residual effects were predicted to be not significant and do not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.
- **Page xxxviii.** Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.
- **Page xxxix.** Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.
- **Page xxxix.** Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO.

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016).
- **Page 14.** *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully

Commented [IB1]: Although it is obviously not possible in this to context to demonstrate 100% sterility with 100% certainty, estimates should be based on careful experimental design and accurately reflect the proportion of sterility based on representative samples. To date, details needed to evaluate these protocols and estimates have not been provided.



investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur.

- **Page 16.** The dissolved oxygen (DO) values ~~to apply~~ to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a potential concern and use of these sites should be reevaluated.
- **A sentence on p. 17** stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain.
- **Page 17.** The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.
- **Page 21.** It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland.
- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. If so, on what frequency or under what conditions, or is it only in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers.
- **Page 64.** From an Introduction and Transfers perspective and the genetic and ecological interactions of farmed Atlantic Salmon and wild Salmon, the applicant proposes the use of Triploid European-origin salmon. European-origin farmed salmon have never been utilized for these purposes in Newfoundland. The CSAS office is currently concluding a technical paper on the potential risks associated with this introduction and when published, it will further inform DFO and the applicant on the risks associated.
- Salmon aquaculture is well established as an industry in NL however, the use of triploids and European-origin stock will be a new introduction. While it's being considered under the EIS, the genetic and ecological impacts will be further assessed under the National Code on Introduction and Transfers. All legislative/regulatory reviews, authorization, and licensing requirements will have to be met as per usual for salmonid aquaculture.
- **Page 73.** *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.

Commented [IB2]: Testing for sterility should be conducted at multiple time points throughout the production cycle, most importantly just before introduction into sea cages



- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc. is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.
- **Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency.
- **Page 92.** Other Mitigation Measures. What are the contents of an escape response kit?
- **Page 92.** The recapture components identified are in agreement with requirements under the Code of Containment for the Culture of Salmonids in Newfoundland and Labrador.
- **Page 96.** Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites."* In fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

- Several times in the document, there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30 km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions.* If such distances were mandated, there would not be an existing salmon aquaculture industry on the South Coast.
- **Page 99.** *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue.
- **Page 100.** *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."* These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation



between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

- **Page 101.** The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon.
- **Page 107.** The EIS states "*In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene*". The statement is incorrect. Security breaches will be handled by the RCMP.

Section 2.8. Accidents and Malfunctions

- **Page 123.** The EIS highlight gear breaking free and becoming a navigational hazard and a source of entanglement with other fishing gear. Other source of entanglement omitted from this section is entanglement with marine mammals and sea turtles. Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail.

Section 3.0. Effects Assessment Methodology

- **Page 130.** Study Area. It states that "*The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA*" and that "*This is considered the maximum extent wherein there is potential for effects of the Project to occur...*" Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented.
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.
- **Page 140.** Wind rose(s) should be added to illustrate the statement "*The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer.*" The sentence "*The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter*" is unclear. Please revisit and clarify.
- **Page 141.** "*A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period.*" A reference should be provided for this statement.

4.2.2. Physical Environment

- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area,



published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: "*Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important.*" This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of data (i.e. spring and neap cycle in Newfoundland wind forcing and the Labrador Current are variable on timescales of days to seasons [or more]); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site.

- **Page 144.** Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.
- **Page 145.** Flood and Tidal Zones. "*During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.*" A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.
- **Page 160.** Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if there were collected, and it was not discussed in the report.



3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.
- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.
 - **Page 170.** Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.3. Wild Atlantic Salmon

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.
- **Page 174.** Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.
- **Page 175.** The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.
- **Page 175.** Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon.

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 208.** The statement "currently there is a shift back to a groundfish-based fishery (Fig. 4.17)." This statement is not clear from figure referenced. It's recommended to add other supporting literature.
- **Page 224.** to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); to what magnitude?
- **Page 228.** "...and quota adjustments in areas that show a flux in population demographics." This statement should be clarified.

Commented [D3]: Format – Most/all other bullet statements have been separated by a space. Should this be done here as well?

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 251.** Are there are recent data for primary product value for muscles post 2007.

4.8. Data Gaps

- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and



chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited. *Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.*
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.
- **Page 359.** Table 7.3 (and page 377, Table 7.6). The tables report that the potential for negative environmental effects is not significant, but the Proponent has assigned a medium level of confidence throughout these tables. A medium level of confidence would indicate that the risk of each outcome cannot be "not significant."
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.
- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.
- **Page 363.** "It is important to consider all of these visual indicators when assessing for impacts of aquaculture since *Beggiatoa* mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoulene et al. 2014, 2016)." They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time period are should be identified as *minimum* fallowing times.
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p. 370).
- **Page 371.** Production of Waste Materials. There is no integration of existing information about the local environment, or other aquaculture sites.



Section 7.2. Wild Salmon VEC

- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Section 7.3.3 & 7.3.3. Marine Mammals & Sea Turtles

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. The same can be said for table 7.12 and 7.13.

Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1. highlights potential interactions with lights and fish and fish habitat. However, this is excluded in table 7.14

Section 7.7. Accidents and Malfunctions

- **Page 434.** The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.
- **Page 435.** *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.
- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.
- **Page 436.** There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low abundances.
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys.

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Commented [IB4]: Nonetheless, indirect genetic and ecological impacts can occur whether or not triploids escape or not and regardless of whether they enter rivers.

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Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.
- **Page 476.** Accidental Events. Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.



Section 7.9.2. Accidents and Malfunctions

- **Page 480.** It is unlikely that the residual effects would be not significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, especially for a complete cage breach.

Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.
- **Page 4, Para. 2.** Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).
- **Page 15, Para. 2.** It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past two consecutive years, which has not been seen since the commercial moratorium in 1992.
- **Page 17.** Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.
- **Page 36.** It states that "*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*" and that this could affect migration patterns if wild salmon "*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey.*" This was not mentioned and discussed in the main EIS document.
- **Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon.** The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river. However, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.
- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.
- **Page 56.** Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.
- Consultations between Grieg NL and Fisheries and Oceans Canada are currently ongoing

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

- The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure).

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Commented [D5]: Format - In places, quoted statements are often shown in "*italics*" with double quotation marks. Should italics and double quotes be used here? This happens in other areas as well.



- **Page 31.** It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.
- **Page 32, Para. 1.** The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.
- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.
- **Page 32, Para. 5.** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.
- **Page 32, Para. 6.** Once again there is reference to seeking the assistance of 'third-party providers such as local fishermen' and engaging in recapture efforts 'as quickly as possible.' Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).
- **Page 33.** Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.
- **Page 36.** Two of the marine sites - Gallows Harbour and Ship Island – have been identified as predominately (50%+) soft bottom substrates and monitoring completed as part of this proposal does not meet the standard for soft bottom substrates, additional monitoring will be required. This can be further obtained as part of the subsequent, provincially-led site licensing review process.
- **Page 49.** *"Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)."* However, only measurements at one point for each site are reported.

Thus, the statement: *"siting of sea cages at locations with suitable currents and depth to distribute organic waste,"* which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.



Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

- The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping 20 hours to a few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description given in Appendix D of the Fish and Fish Habitat Component Study states that tide is a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).
- **Page 5.** Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.
- **Page 28.** *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).
- **Page 36.** *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* Information on the tidal analysis results is required.
- **Page 36.** *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*
- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).



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Canada

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Canada



- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.
- **Page 45.** As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented are even less reliable. The dataset used should be clearly stated and described (resolution and limitations).
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.

Thank you for providing the opportunity to review and provide comment on this project EA Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Canada

Johnson, Roger

From: Griffiths, Helen
Sent: Friday, July 6, 2018 4:09 PM
To: Johnson, Roger; Hendry, Christopher
Subject: RE: DRAFT FOR REVIEW: Media Lines - EA

Some suggestions in red

From: Johnson, Roger
Sent: July-06-18 12:27 PM
To: Griffiths, Helen; Hendry, Christopher
Subject: Fw: DRAFT FOR REVIEW: Media Lines - EA

Any comments

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Ruddock, Stella D <Stella.Ruddock@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 12:22 PM
To: Johnson, Roger
Subject: DRAFT FOR REVIEW: Media Lines - EA

Hi Roger,

Please see below as discussed. These are based on preliminary information, and we can add additional detail about our recommendations, etc., as we go. Please let me know if there's other information we should add at this point. Also if you'd like to make any changes or clarifications.

I'm available this afternoon; let me know if you'd like to discuss further.

Thanks,
Stella

Anticipatory Media Lines Environmental assessment of Grieg's proposed operation in Placentia Bay

Issue

In 2015, Grieg NL registered plans to expand aquaculture operations into Placentia Bay. In 2016, the provincial Department of Environment and Conservation (now known as Municipal Affairs and Environment) released the undertaking from further environmental assessment. The release was challenged in court, resulting in a court-ordered Environmental Impact Statement (EIS). As per normal provincial Environmental Assessment (EA) process, DFO has been asked to provide advice to the EA Committee.

Strategic Considerations and Public Environment

- Grieg's proposed expansion of operations into Placentia Bay has been under intense media scrutiny from the beginning due to criticism from anti-aquaculture groups.

- Some disapproval may be redirected at DFO due to its regulatory role in the risk assessment process. just the risk assessment process??
- The South Newfoundland population of Atlantic Salmon has been assessed under COSEWIC as “threatened.” This may add to concerns about the effects Grieg’s activities will have on wild salmon.

Recommendation

These media lines are anticipatory and will be used if we receive a media inquiry related to DFO’s role in the EIS process. Aquaculture is a provincial lead; therefore, media will be referred to them for questions outside of DFO’s area of responsibility.

Media lines (Responsive)

- DFO has an advisory role in provincial Environment Assessment (EA) processes. In the case of aquaculture operations, we review the registration materials and provide advice to the EA Committee relevant to our mandate. Our recommendations are based on whether there is sufficient information to enable us to address DFO’s regulatory role in protecting fish and fish habitat.
- DFO also ensures the application of the *Fisheries Act* to activities that may cause serious harm to commercial, recreational and aboriginal fisheries and fish that support these fisheries.
- While DFO’s responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management, approval of the aquaculture project itself lies with the Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information.

Stella Ruddock
 Communications Advisor (Ecosystems Management)
 Newfoundland and Labrador Region
 Fisheries and Oceans Canada/Government of Canada
Stella.Ruddock@dfo-mpo.gc.ca/ Tel: 709-772-7630
 Media Inquiries: Media.NL@dfo-mpo.gc.ca/ Tel: 709-772-3375

Follow us on Twitter! @DFO_NL

Finn, Ray

From: Griffiths, Helen
Sent: Friday, July 6, 2018 6:07 PM
To: Finn, Ray
Subject: Grieg update

Hi

Meeting went well with Barry and Jackie. She wants some changes and suggested we stick to the significant comments and not so much the nit picky stuff. Roger said after to me that it will take a day or two to make the changes. We should be good for July 12.

Helen

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Grant, Carole
Sent: Monday, July 9, 2018 10:21 AM
To: Parrill, Erika
Subject: RE: Grieg Aquaculture

From: Parrill, Erika
Sent: July-09-18 10:21 AM
To: Grant, Carole
Subject: RE: Grieg Aquaculture

I just spoke with Roger and he and I are of the same opinion that we cannot change the Science Response at this time as it has already been approved and circulated to others. To ensure transparency, I do not think we can make further edits to the content of the Science Response. Don't worry though - Roger is incorporating your edits within his response letter. He's hoping to have that finished come Wednesday.

><(((0>'-''><(((0>'-''><(((0>'-''><(((0>'-''><(((0>

From: Grant, Carole
Sent: Saturday, July 7, 2018 11:04 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Please see attached comments/suggested edits I forwarded to Roger on behalf of Salmonids. I realize Ben has already signed off on the Science Special Response, however, there may be a few changes that should be reflected in this response before it's posted.

Carole

From: Johnson, Roger
Sent: July 6, 2018 12:20 PM
To: Hendry, Christopher; Grant, Carole

Subject: Fw: Grieg Aquaculture

FYI

Can discuss if required

Sent from my BlackBerry 10 smartphone on the Bell network.
From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:39 AM
To: Finn, Ray; Griffiths, Helen; Perry, Jacqueline; McCallum, Barry
Cc: Butler, Annette; Pilgrim, Bret; Decker, Shelley
Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

While I encourage comments and will incorporate all important changes you may want I must stress that the deadline for submission to the province is next week so it will be difficult to incorporate any sweeping changes/directions due to limited time.

I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca<mailto:Roger.Johnson@dfo-mpo.gc.ca>

s.16(2)(c)

Decker, Shelley

From: Johnson, Roger
Sent: Monday, July 9, 2018 2:06 PM
To: Pilgrim, Bret; Decker, Shelley
Cc: Griffiths, Helen
Subject: FW: Grieg Aquaculture
Attachments: Greig Aquaculture DFO_Doc_BBP-Salmonids.doc

FYI

The CSAS office is thinking of revising the CSAS document to include these - not sure that is a good idea

The edits I am most concerned with are the ones the RDG spoke of

-----Original Message-----

From: Grant, Carole
Sent: Saturday, July 7, 2018 11:00 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>; Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

This time with the attachment. Too late at night for this sort of thing (lol).

From: Johnson, Roger
Sent: July 6, 2018 12:20 PM
To: Hendry, Christopher; Grant, Carole
Subject: Fw: Grieg Aquaculture

FYI

Can discuss if required

Sent from my BlackBerry 10 smartphone on the Bell network.
From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:39 AM
To: Finn, Ray; Griffiths, Helen; Perry, Jacqueline; McCallum, Barry
Cc: Butler, Annette; Pilgrim, Bret; Decker, Shelley
Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

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I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca<mailto:Roger.Johnson@dfo-mpo.gc.ca>

s.16(2)(c)



Fisheries and Oceans
Canada

Pêches et Océans
Canada

P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 12, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf of Grieg NL on dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another as currently, using the proposed logistics. Additional information is required on mitigation measures to address for biosecurity risks associated with the and prevention of introduction and spread of biofouling invasive species.
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly, weekly, daily) monitoring and whether, if the ROV will be shared between BMAs.
- **Page xxxi. Assessment Boundaries.** The EIS states that the boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species. Also, there is good scientific evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon have also been caught within the bay. Therefore, it is seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.
- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Canada



- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, ~~the opposite is true~~; most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them.
- **Page xxxiv. Control of Sea Lice.** Please provide a detailed explanation of how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.
- **Page xxxiv. Effects on Benthic Habitat.** *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant." (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).
- **Page xxxv.** Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours.
- **Page xxxvi.** Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.
- **Page xxxvi.** Studies exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These should be included and discussed.
- **Page xxxvii.** In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty. The concluding statement that residual effects were predicted to be not significant and do not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.
- **Page xxxviii.** Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.
- **Page xxxix.** Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.
- **Page xxxix.** Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO.

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016).
- **Page 14.** *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully

Commented [B1]: Although it is obviously not possible in this to context to demonstrate 100% sterility with 100% certainty, estimates should be based on careful experimental design and accurately reflect the proportion of sterility based on representative samples. To date, details needed to evaluate these protocols and estimates have not been provided.



investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur.

- **Page 16.** The dissolved oxygen (DO) values ~~to apply to~~ define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a potential concern and use of these sites should be re-evaluated.
- **A sentence on p. 17** stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain.
- **Page 17.** The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.
- **Page 21.** It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland.
- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. If so, how often or under what conditions, or is it only in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers.
- **Page 64.** From an Introduction and Transfers perspective and the genetic and ecological interactions of farmed Atlantic Salmon and wild Salmon, the applicant proposes the use of Triploid European-origin salmon. European-origin farmed salmon have never been utilized for these purposes in Newfoundland. The CSAS office is currently concluding a technical paper on the potential risks associated with this introduction and when published, it will further inform DFO and the applicant on the risks associated.
- Salmon aquaculture is well established as an industry in NL, however, the use of triploids and European-origin stock is/will be a new to the province introduction. While it's being considered during the environmental assessment phase, under the EIS, the genetic and ecological impacts will be further assessed when reviewed under the National Code on Introduction and Transfers. All legislative/regulatory reviews, authorization, and licensing requirements will have to be met as per usual for salmonid aquaculture.

Commented [182]: Testing for sterility should be conducted at multiple time points throughout the production cycle, most importantly just before introduction into sea cages



- **Page 73.** "Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated." Please provide a detailed explanation of these mitigation responses should be provided.
- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc. is discussed briefly in the escapee section. Additional information should be provided regarding the use SOPs used during this process.

Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.
- **Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that "typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes." Please revisit and clarify for consistency.
- **Page 92.** Other Mitigation Measures. What are the contents of an escape response kit?
- **Page 92.** The recapture components identified are in agreement with requirements under the Code of Containment for the Culture of Salmonids in Newfoundland and Labrador.
- **Page 96.** Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: "The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites." is not factual as, in fact, many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The following non-scheduled rivers (Table 1) have been overlooked in the EIS.

Commented [D3]: Not sure why this statement is necessary.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

- Several times in the document, there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30 km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions.* If such distances were mandated, there would not be an existing salmon aquaculture industry on the South Coast.

Commented [D4]: They don't say that it's 'mandated', just recommended.

- **Page 99.** "Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish." While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue.



- **Page 100.** "A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..." These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.
- **Page 101.** The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of, diseases among farmed salmon, and possibly to wild Atlantic Salmon.
- **Page 107.** The EIS states "In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene". The statement is incorrect as ~~as s-~~Security breaches will be handled by the RCMP.

Section 2.8. Accidents and Malfunctions

- **Page 123.** The EIS highlight gear breaking free and becoming a navigational hazard and a source of entanglement with other fishing gear. Other source of entanglement omitted from this section is entanglement with marine mammals and sea turtles. Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail.

Section 3.0. Effects Assessment Methodology

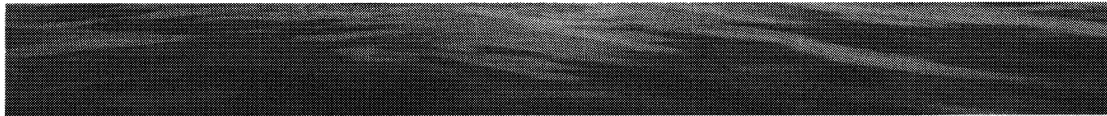
- **Page 130.** Study Area. It states that "The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA" and that "This is considered the maximum extent wherein there is potential for effects of the Project to occur..." Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented.
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.
- **Page 140.** Wind rose(s) should be added to illustrate the statement "The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer." The sentence "The tropical-to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter" is unclear. Please revisit and clarify.
- **Page 141.** "A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period." A reference should be provided for this statement.

4.2.2. Physical Environment



- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environmental assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: "*Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important.*" This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of data (i.e. spring and neap cycle in Newfoundland wind forcing and the Labrador Current are variable on timescales of days to seasons [or more]); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site.
- **Page 144.** Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.
- **Page 145.** Flood and Tidal Zones. "*During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.*" A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#)).
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.
- **Page 160.** Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for

Canada



the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or will be if there were collected, and it was not discussed in the report.

3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key, but there are no references to prevent this introduction. This needs to be addressed.
- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.
 - **Page 170.** Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.3. Wild Atlantic Salmon

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.
- **Page 174.** Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater within Newfoundland systems.
- **Page 175.** The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. Thus, any impacts associated with salmon aquaculture such as disease and parasites may also potentially impact salmon from areas well beyond Placentia Bay.
- **Page 175.** Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). Placentia Bay is characterized by small isolated regional populations of Atlantic Salmon.

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 208.** The statement "*currently there is a shift back to a groundfish-based fishery (Fig. 4.17).*" This statement it is not clear from figure referenced. It's recommended to add other supporting literature.
- **Page 224.** to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); and to what magnitude?
- **Page 228.** The statement "*...and quota adjustments in areas that show a flux in population demographics.*" This statement should be clarified.

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Commented [D5]: Format – Most/all other bullet statements have been separated by a space. Should this be done here as well?

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4.4.2.3. Domestic Fisheries in the Study Area

- **Page 251.** Are there areny recent data for primary product value for mussels seoles post 2007?

4.8. Data Gaps

Canada



- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be followed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. *"Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)."* The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.
- **Page 359.** Table 7.3 (and page 377, Table 7.6). The tables report that the potential for negative environmental effects is not significant, but the Proponent has assigned a medium level of confidence throughout these tables. A medium level of confidence would indicate that the risk of each outcome cannot be "not significant."
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.
- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild Atlantic Salmon smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.
- **Page 363.** *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016.
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time period ~~are~~ should be identified as *minimum* fallowing times.
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p. 370).
- **Page 371.** Production of Waste Materials. There is no integration of existing information about the local environment, or other aquaculture sites.



Section 7.2. Wild Salmon VEC

- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Section 7.3.3 & 7.3.3. Marine Mammals & Sea Turtles

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. The same applies to can be said for Tables 7.12 and 7.13.

Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1: highlights potential interactions with lights and fish and fish habitat. However, this is excluded in Table 7.14

Section 7.7. Accidents and Malfunctions

- **Page 434.** The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

- **Page 435.** *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes.

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- *but without revealing whether approximately the same numbers of diploid and triploid salmon were stocked near these Norwegian rivers. Therefore, the results may have been due to the fact that there were significantly more diploid salmon stocked in cages and hence why more showed up in the recreational fishery.*

Commented [IB6]: Nonetheless, indirect genetic and ecological impacts can occur regardless of whether or not triploids escape and regardless of whether they enter rivers.

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- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.
- **Page 436.** There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low salmon abundances.
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys.

Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.



- **Page 476. Accidental Events.** S. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.
- Sampling would involve collecting and analyzing blood samples. Monitoring of impacts would likely be undertaken by DFO in collaboration with Grieg NL.

Section 7.9.2. Accidents and Malfunctions

- **Page 480.** It is unlikely that the residual effects would be not be significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, especially for a complete cage breach.

Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.
- **Page 4, Para. 2.** Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).
- **Page 15, Para. 2.** It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past two consecutive years, which has not been seen since the commercial moratorium in 1992.
- **Page 17.** Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.
- **Page 36.** It states that "*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*" and that this could affect migration patterns if wild salmon "*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey.*" This was not mentioned and discussed in the main EIS document.
- **Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon.** The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river. However, it is also important to note that on page 16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.
- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.
- **Page 56.** Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.
- Consultations between Grieg NL and Fisheries and Oceans Canada are currently ongoing

Commented [D7]: Format - In places, quoted statements are often shown in "*italics*" with double quotation marks. Should italics and double quotes be used here? This happens in other areas as well.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)



- The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure).

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

- **Page 31.** It states that *“if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented.”* This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.
- **Page 32, Para. 1.** The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.
- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.
- **Page 32, Para. 5.** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.
- **Page 32, Para. 6.** Once again there is reference to seeking the assistance of ‘third-party providers such as local fishermen’ and engaging in recapture efforts ‘as quickly as possible.’ Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that ‘recapture nets will be checked four times daily while deployed’. Depending on time of year when recapture efforts occur, and if it’s deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).
- **Page 33.** Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.
- **Page 36.** Two of the marine sites - Gallows Harbour and Ship Island – have been identified as predominately (50%+) soft bottom substrates and monitoring completed as part of this proposal does not meet the standard for soft bottom substrates, additional monitoring will be required. This information can also be further obtained as part of the subsequent, provincially-led site licensing review process.
- **Page 49.** *“Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water*



depth for sea cages, and suitable bottom type (i.e., >50% hard bottom)." However, only measurements at one point for each site are reported.

Thus, the statement: "siting of sea cages at locations with suitable currents and depth to distribute organic waste," which is repeated throughout the document and used to support the claim that most of the VEC potential effects are "not significant" is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

- The ocean current time-series used for this study are too short to provide statistically robust estimates of dispersion. Looping 20 hours to a few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description provided in Appendix D of the Fish and Fish Habitat Component Study states that tide is a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies carried out in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance of low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in the absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).
- **Page 5.** Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.
- **Page 28.** "The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track." The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).
- **Page 36.** "In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay." A reference should be provided here, and also where other such statements are made. For example, the statement that follows: "Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important." Information on the tidal analysis results is required.
- **Page 36.** "Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters." This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind



rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data ~~are as~~ data reports: Hart et al. 1999; Schillinger et al. 2000).
- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although it's long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.
- **Page 45.** As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented are even less reliable. The dataset which was used should be clearly stated and described (resolution and limitations).
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.

Thank you for providing the opportunity to review and provide comments on this project EA Report. If you have any questions or comments with respect to the above or if you require anything further, please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca.).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Canada

Sent: Saturday, July 7, 2018 11:04 PM
To: Parrill, Erika <Erika.Parrill@dfo-mpo.gc.ca>
Subject: FW: Grieg Aquaculture

Hi Erika,

Please see attached comments/suggested edits I forwarded to Roger on behalf of Salmonids. I realize Ben has already signed off on the Science Special Response, however, there may be a few changes that should be reflected in this response before it's posted.

Sorry we weren't able to get back to you sooner on this.

Carole

From: Johnson, Roger
Sent: July 6, 2018 12:20 PM
To: Hendry, Christopher; Grant, Carole
Subject: Fw: Grieg Aquaculture

FYI

Can discuss if required

Sent from my BlackBerry 10 smartphone on the Bell network.
From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:39 AM
To: Finn, Ray; Griffiths, Helen; Perry, Jacqueline; McCallum, Barry
Cc: Butler, Annette; Pilgrim, Bret; Decker, Shelley
Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

While I encourage comments and will incorporate all important changes you may want I must stress that the deadline for submission to the province is next week so it will be difficult to incorporate any sweeping changes/directions due to limited time.

I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson

Sr. Biologist - Mining

Fisheries Protection Program

Dept. of Fisheries and Oceans

Telephone: (709)772-3296 (O) [REDACTED] (cell)

E-mail: Roger.Johnson@dfo-mpo.gc.ca<mailto:Roger.Johnson@dfo-mpo.gc.ca>

s.16(2)(c)

No further information has been removed or severed from this page

**Pages 1013 to / à 1025
are duplicates of
sont des duplicatas des
pages 997 to / à 1009**

Decker, Shelley

From: Griffiths, Helen
Sent: Monday, July 9, 2018 2:26 PM
To: Johnson, Roger; Pilgrim, Bret; Decker, Shelley
Subject: RE: Grieg Aquaculture

Yes, exactly. This document is changing so they shouldn't be incorporating into CSAS at this point.

-----Original Message-----

From: Johnson, Roger
Sent: July-09-18 2:23 PM
To: Griffiths, Helen; Pilgrim, Bret; Decker, Shelley
Subject: RE: Grieg Aquaculture

We will try but I have shortened our document by 25 % following Jackie's direction so some of carols comments may be on points that no longer exist in my letter to province.

Whatever CSAS does with their report is no longer any of our concern.

I would like to chat briefly about next steps

-----Original Message-----

From: Griffiths, Helen
Sent: Monday, July 9, 2018 2:19 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

To incorporate Carole's comments on document you folks prepared into CSAS report??

-----Original Message-----

From: Johnson, Roger
Sent: July-09-18 2:06 PM
To: Pilgrim, Bret; Decker, Shelley
Cc: Griffiths, Helen
Subject: FW: Grieg Aquaculture

FYI

The CSAS office is thinking of revising the CSAS document to include these - not sure that is a good idea

The edits I am most concerned with are the ones the RDG spoke of

-----Original Message-----

From: Grant, Carole
Sent: Saturday, July 7, 2018 11:00 PM

To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>; Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>
Subject: RE: Grieg Aquaculture

This time with the attachment. Too late at night for this sort of thing (lol).

From: Johnson, Roger
Sent: July 6, 2018 12:20 PM
To: Hendry, Christopher; Grant, Carole
Subject: Fw: Grieg Aquaculture

FYI

Can discuss if required

Sent from my BlackBerry 10 smartphone on the Bell network.
From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Friday, July 6, 2018 9:39 AM
To: Finn, Ray; Griffiths, Helen; Perry, Jacqueline; McCallum, Barry
Cc: Butler, Annette; Pilgrim, Bret; Decker, Shelley
Subject: Grieg Aquaculture

In preparation for the meeting this afternoon , please find attached the FPP draft response to the review of the Grieg Aquaculture EIS.

In drafting this document I have endeavored to incorporate all the comments received from the various DFO Sectors. To simplify and shorten the response I have shortened some of the comments from the CSAS document and have deleted some of the duplication, however I have left many of the comments as they were in the CSAS paper and have made sure that all relevant points were covered to the level of detail that is required.

While I encourage comments and will incorporate all important changes you may want I must stress that the deadline for submission to the province is next week so it will be difficult to incorporate any sweeping changes/directions due to limited time.

I have been speaking with Communications Branch and we are working together to put together reactive media lines ahead of the submission and eventual posting of our comments on the NL EA website.

I look forward to hearing from you this afternoon and into early next week.

I trust this document will meet with your expectations.

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca<mailto:Roger.Johnson@dfo-mpo.gc.ca>

s.16(2)(c)

Meade, James

From: Meade, James
Sent: July-09-18 3:34 PM
To: Donnet, Sebastien G
Subject: RE: Translation questions - 11040 SRR - Grieg EIS

This is excellent-thx!
Very much appreciated.

Cheers,
Jim

From: Donnet, Sebastien G
Sent: July-09-18 2:27 PM
To: Meade, James
Subject: RE: Translation questions - 11040 SRR - Grieg EIS

Hi Jim,

see below.
cheers,

Sebastien

From: Meade, James
Sent: 2018-July-09 13:35
To: Donnet, Sebastien G
Subject: FW: Translation questions - 11040 SRR - Grieg EIS

Hi Sebastien,
Would you please review the request below and determine if the suggested translated text is correct or if not, please provide correct translation (in the last column of the table).

Thanks and Cheers,
Jim

From: [REDACTED] **On Behalf Of** !MCT mbx Questions Canada
Sent: July-09-18 10:38 AM
To: Meade, James
Cc: [REDACTED]
Subject: Translation questions - 11040 SRR - Grieg EIS

Greetings,

Could you please have a look at the questions below regarding the translation of the document mentioned in the subject line.

s.19(1)

Please reply all to this message.

Thank you very much for your help,



Lionbridge Canada	Ref. #: / N/Réf.	DFO180629-32
Customer	Ref. #: / V/Réf.	
	Due Date / Échéance	July 11 th 15h30

File name / Fichier	Page	Term/Terme	Our suggestion / Notre proposition	Question	Answer / Réponse
Grieg PB Aquaculture EIS SRR - June 28	Page 3	crew change sites	Sites de changement d'équipage	Is there an official french equivalent for those sites?	I don't think. Usually names only have one version in NL. Particularly on the south coast where English and French have been mixed up. "Sites de changement d'équipage" sounds right to me
Grieg PB Aquaculture EIS SRR - June 28	Page 10	CHS 15s	Service hydrographique du Canada 15s	To what does the « s » at the end of 15 refer to? Is there a french equivalent for it?	s= second (arc-second, in fact). A unit regularly used in mapping. 1 degree = 60 minutes = 3600 seconds ~ 100 km in our latitudes. Closest translation I could offer would be: "15 second de résolution"
Grieg PB Aquaculture EIS SRR - June 28	Page 20	Emergency licence	permis d'urgence	Is there a french equivalent already in use for this licence?	I'm assuming it is with respect to our comment of Page 32, Para. 2 of Appendix T of the document. "permis d'urgence" appears OK to me and there is no specific French name of that license

File name / Fichier	Page	Term/Terme	Our suggestion / Notre proposition	Question	Answer / Réponse
					that I'm aware of.
Grieg PB Aquaculture EIS SRR - June 28	Page 20	Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000	conformes aux rapports de données	Could you elaborate on what this means?	It should be written: "Memorial University data are available as data reports:" which in French would be "Les données de l'Université Memorial sont disponibles sous forme de rapports de données"

Meade, James

From: Meade, James
Sent: July-09-18 3:37 PM
To: 'IMCT mbx Questions Canada'
Cc: [REDACTED] Parrill, Erika
Subject: RE: Translation questions - 11040 SRR - Grieg EIS

[REDACTED]
Please see responses to questions in the table below.

Cheers,
Jim

From: [REDACTED] **On Behalf Of** IMCT mbx Questions Canada
Sent: July-09-18 10:38 AM
To: Meade, James
Cc: [REDACTED]
Subject: Translation questions - 11040 SRR - Grieg EIS

Greetings,

Could you please have a look at the questions below regarding the translation of the document mentioned in the subject line.

Please reply all to this message.

Thank you very much for your help,



s.19(1)



Lionbridge Canada	Ref. #: / N/Réf.	DFO180629-32
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	Due Date / Échéance	July 11 th 15h30

File name / Fichier	Page	Term/Terme	Our suggestion / Notre proposition	Question	Answer / Réponse
Grieg PB Aquaculture EIS SRR - June	Page 3	crew change sites	Sites de changement d'équipage	Is there an official french equivalent for those sites?	Translation OK

File name / Fichier	Page	Term/Terme	Our suggestion / Notre proposition	Question	Answer / Réponse
28					
Grieg PB Aquaculture EIS SRR - June 28	Page 10	CHS 15s	Service hydrographique du Canada 15s	To what does the « s » at the end of 15 refer to? Is there a french equivalent for it?	s= second (arc- second, in fact). A unit regularly used in mapping. 1 degree = 60 minutes = 3600 seconds ~ 100 km in our latitudes. Closest translation I could offer would be: "15 second de résolution"
Grieg PB Aquaculture EIS SRR - June 28	Page 20	Emergency licence	permis d'urgence	Is there a french equivalent already in use for this licence?	Translation OK
Grieg PB Aquaculture EIS SRR - June 28	Page 20	Memorial University data are as data reports : Hart et al. 1999; Schillinger et al. 2000	conformes aux rapports de données	Could you elaborate on what this means?	English version should be written: "Memorial University data are <u>available</u> as data reports:" which in French would be "Les données de l'Université Memorial sont disponibles sous forme de rapports de données"

Johnson, Roger

From: Pilgrim, Bret
Sent: Tuesday, July 10, 2018 11:10 AM
To: Johnson, Roger
Subject: grieg - DONE

All done – latest version file name: *DFO Doc BBP RJ* . Suggesting changing the file name before sending it back to the province haha.

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562

Johnson, Roger

From: Griffiths, Helen
Sent: Tuesday, July 10, 2018 4:16 PM
To: Johnson, Roger
Subject: RE: Greig

JF Larue. He's Aqua DG. I see he had Chris on email. He told me to do that last week, I called JF and left voice msg for him to call me on landline or cell but never heard back. Maybe Chris can take that over

From: Johnson, Roger
Sent: July-10-18 4:12 PM
To: Griffiths, Helen
Subject: Fw: Greig

Who is jf and how do I brief

I can follow up with Tonia -told you she was our contact in NHQ

Let's discuss in am

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Sent: Tuesday, July 10, 2018 4:05 PM
To: Johnson, Roger
Cc: Griffiths, Helen; Hendry, Christopher
Subject: Greig

In addition to briefing JF on Greig please also engage with Tonia Gordanier.
I briefed out on the potentially controversial file on today's NEMO.
Finally let's consider for inclusion in the AES weekly report.

Ray

[REDACTED] (cell)
(709) 772 - 2442. (office)

Sent via Blackberry

s.16(2)(c)

Johnson, Roger

From: Finn, Ray
Sent: Tuesday, July 10, 2018 4:25 PM
To: Hendry, Christopher
Cc: Griffiths, Helen; Johnson, Roger
Subject: RE: Greig

Chris
Given we are in an EA mode now best be led from FPP

Not unlike my call this AM with province – all about EA

Thks
Ray

From: Hendry, Christopher
Sent: Tuesday, July 10, 2018 4:23 PM
To: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>; Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>; Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: Greig

I briefed NCR yesterday on the weekly Departmental Aquaculture Operations Committee on the current status. Is JF briefing to come from Aquaculture or FPP?

Chris

From: Griffiths, Helen
Sent: July-10-18 4:21 PM
To: Finn, Ray; Johnson, Roger
Cc: Hendry, Christopher
Subject: RE: Greig

I called JF on Friday, left voice msg for him to call me on landline or cell but never heard back.

This was in AES report June 4. Shall we include again? Only update from June 4 submission would be we provided comments back to province

From: Finn, Ray
Sent: July-10-18 4:05 PM
To: Johnson, Roger
Cc: Griffiths, Helen; Hendry, Christopher
Subject: Greig

In addition to briefing JF on Greig please also engage with Tonia Gordanier.
I briefed out on the potentially controversial file on today's NEMO.
Finally let's consider for inclusion in the AES weekly report.

Ray

Johnson, Roger

From: Johnson, Roger
Sent: Wednesday, July 11, 2018 9:58 AM
To: Griffiths, Helen
Cc: Hendry, Christopher; Pilgrim, Bret
Subject: media lines
Attachments: media lines RJ.docx

Have taken the liberty of redoing these

Red text -> Helen
Yellow highlight -> Roger
Green highlight -> Chris

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Anticipatory Media Lines

Environmental assessment of Grieg's proposed operation in Placentia Bay

Issue

In 2015, Grieg NL registered plans to expand aquaculture operations into Placentia Bay. In 2016, the provincial Department of Environment and Conservation (now known as Municipal Affairs and Environment) released the undertaking from further environmental assessment. The release was challenged in court, resulting in a court-ordered Environmental Impact Statement (EIS). As per normal provincial Environmental Assessment (EA) process, DFO has been asked to provide advice to the EA Committee.

Strategic Considerations and Public Environment

- Grieg's proposed expansion of operations into Placentia Bay has been under intense media scrutiny from the beginning due to criticism from anti-aquaculture groups.
- Some disapproval may be redirected at DFO due to several groups thinking that this project will damage wild Atlantic Salmon stocks and DFO should block the project.
- The South Newfoundland population of Atlantic Salmon has been assessed under COSEWIC as "threatened." This may add to concerns about the effects Grieg's activities will have on wild salmon.

Recommendation

These media lines are anticipatory and will be used if we receive a media inquiry related to DFO's role in the EIS process. Aquaculture is a provincial lead; therefore, media will be referred to them for questions outside of DFO's area of responsibility.

Media lines (Responsive)

- DFO has an advisory role in provincial Environment Assessment (EA) processes. DFO routinely review provincial EA registrations, Environmental Preview Reports or in this case an Environmental Impact statement and provide advice to the Provincial EA Committee relevant to our mandate.
- DFO has concluded a comprehensive review of the Grieg EIS and has provided advice to the Provincial EA Committee based on this review by all sectors of our department.
- While DFO's responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management, approval of the aquaculture project itself lies with the Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information.
- Upon completion of the current Environmental Assessment process, the proponent will still be subject to subsequent regulatory approvals for aquaculture site licenses and introductions and transfers, both of which will involve DFO as well as Provincial regulators.

Johnson, Roger

From: Johnson, Roger
Sent: Wednesday, July 11, 2018 10:32 AM
To: Griffiths, Helen
Subject: the latest and greatest
Attachments: DFO Doc BBP RJ.doc

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 12, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Assessment of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf Grieg NL on dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another, using the proposed logistics. Additional information is required on mitigation measures for biosecurity risks and prevention of introduction and spread of biofouling invasive species.
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency in which the cages will be monitored (e.g., monthly monitoring, if the ROV is to be shared between BMAs).
- **Page xxxi. Assessment Boundaries.** The EIS states the boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur, there is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Studies also exist for migratory movements on south coast (see Reddin and Lear 1990; Pippy 1982). These studies should be included and discussed. This comment applies to several sections of the EIS and should be clarified throughout the document.
- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.
- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is confusing as most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites. Please provide a

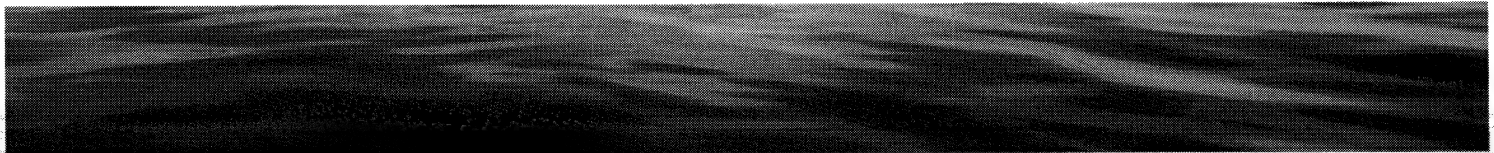


figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them and how these distances were calculated. This issue needs to be clarified throughout the document being sure to include known unscheduled salmon rivers as presented in Table 1 below.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

- **Page xxxiv. Control of Sea Lice.** Please explain how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.
- **Page xxxiv. Effects on Benthic Habitat.** *“Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom).”* Given the timeline of the currents data used in the study please clarify how the “not significant” rating was derived.
- **Page xxxv. Fish and Fish Habitat VEC.** The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours.
- **Page xxxvi. Wild Atlantic Salmon VEC.** Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.
- **Page xxxvii.** In the first paragraph, it states that effects are expected *“to be minor, localized and relatively short-term”*. This is not known and the statement does not reflect the large amount of uncertainty, please clarify how this conclusion was derived.
- **Page xxxviii. Sensitive Areas VEC.** It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.
- **Page xxxix. Follow-up Monitoring.** Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO. Although these consultations are currently ongoing this statement needs to be addressed in several other places in the document.

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Please provide detailed methodology for testing to demonstrate 100 % effectiveness.
- **Page 17.** The Executive Summary (p. xxxix) states that *“triploid female salmon do not enter freshwater.”* However, it states here that *“the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes.”* Revisit, provide references and clarify for consistency.



2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, please provide the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland.
- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. What frequency or under what conditions will this happen.
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose.
- **Page 73.** *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* These mitigation responses should be provided.
- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for escapes. Additional information should be provided regarding SOPs used during this process.

Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.
- **Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency.
- **Page 92.** Other Mitigation Measures. What are the contents of an escape response kit?
- Several times in the document, there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions.* Please clarify.
- **Page 100.** *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."* These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.
- **Page 107.** The EIS states *"In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene"*. The statement is incorrect. Security breaches will be handled by the RCMP.



Section 2.8. Accidents and Malfunctions

- **Page 123.** Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear. Please revisit and discuss interaction with lost gear.
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail.

Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

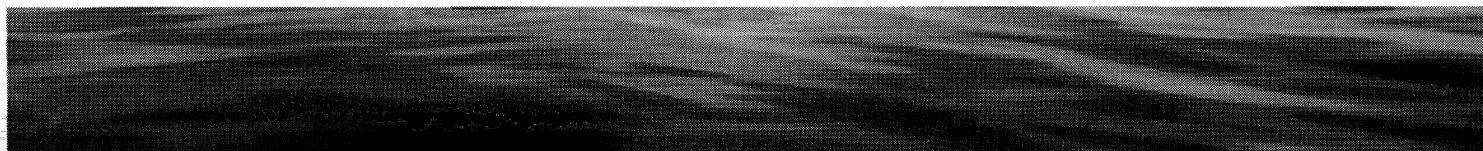
- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added. Wind direction variability (seasonality) should be better documented.
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014).
- **Page 140.** Wind rose(s) should be added to the discussion on wind direction in Placentia Bay.
- **Page 141.** "A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period." A reference should be provided for this statement.

4.2.2. Physical Environment

- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: "Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important." This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone.
- **Page 144.** Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used basic bathymetry and coastline (GEBCO and CHS 15s) which limits its applications in coastal areas. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.
- **Page 145.** Flood and Tidal Zones. "During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights." A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.



- **Page 160. Invasive Species.** The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

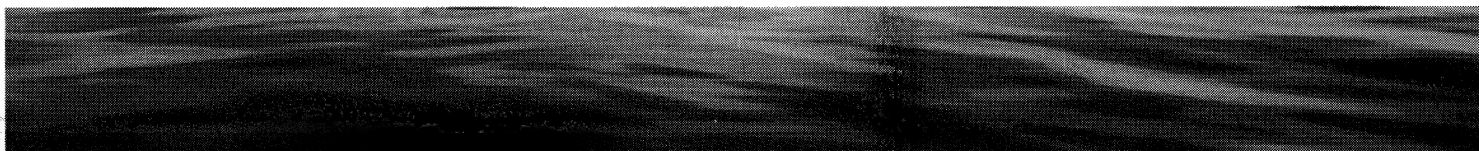
1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels;
 2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if there were collected, and it was not discussed in the report.
 3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.
- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

4.2.3. Wild Atlantic Salmon

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.
- **Page 174. Migratory Patterns.** Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in Newfoundland systems.
- **Page 175. Genetic Population Structure.** The text should be updated to reflect that no diploid escapes were found in 2017 either.
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015).

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 208.** The statement "currently there is a shift back to a groundfish-based fishery (Fig. 4.17)." This statement is not clear from figure referenced. It's recommended to add other supporting literature.
- **Page 224.** to what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); to what magnitude?



- **Page 228.** "...and quota adjustments in areas that show a flux in population demographics." This statement should be clarified.

4.4.2.4. Aquaculture

- **Page 251.** Are there recent data for primary product value for mussels post 2007.

4.8. Data Gaps

- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. As the BMAs will not be followed simultaneously a discussion of potential overall cumulative organic deposition and chemical persistence should be included especially in light of the lack of data on salinity and currents.

Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. "*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*" The correlation could not be found in the document cited.
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects. Please provide further detail.
- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, a discussion of how this could increase mortality on migrating wild smolts and adults should be included. Indirect genetic effects and ecological interactions with wild Atlantic Salmon should be discussed.
- **Page 363.** "*It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016).*" They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016. Please clarify.
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time periods are should be identified as *minimum* fallowing times.
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p. 370). Please provide thresholds to be used.

Section 7.2. Wild Salmon VEC



- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same can be said for table 7.12 and 7.13.

Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1. highlights potential interactions with lights and fish and fish habitat. However, this is excluded in table 7.14, please clarify.

Section 7.7. Accidents and Malfunctions

- **Page 435.** *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017), please clarify.
- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys.

Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Section 7.9.2. Accidents and Malfunctions

- **Page 480.** Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) should be discussed in more detail.

Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.
- **Page 4, Para. 2.** Please correct the statement that 'after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...' as Atlantic Salmon never spend as little as several months in freshwater before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).
- **Page 36.** It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon *"choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey."* This should be discussed in the main EIS document.



- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

- The document cites improved triploidy induction method but data are not provided nor does it appear to be published. Sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure).

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

- **Page 31.** It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals.
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.
- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.
- **Page 32** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).
- **Page 33.** Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

- The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Other time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012)

Appendix D – Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites



- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008). Please revise.
- **Page 28.** *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).
- **Page 36.** *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*
- **Page 36.** ". The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." Please clarify.
- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data are as data reports: Hart et al. 1999; Schillinger et al. 2000).
- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although it's long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area should be referenced and discussed.

Thank you for providing the opportunity to review and provide comment on this project EA Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca.).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Finn, Ray

From: Griffiths, Helen
Sent: Wednesday, July 11, 2018 12:10 PM
To: Finn, Ray
Subject: Re: Grieg update

Calling him at 10am tomorrow

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Finn, Ray
Sent: Wednesday, July 11, 2018 11:50 AM
To: Griffiths, Helen
Subject: RE: Grieg update

Thanks Helen

From: Griffiths, Helen
Sent: Wednesday, July 11, 2018 11:30 AM
To: LaRue, Jean-François <Jean-Francois.LaRue@dfo-mpo.gc.ca>
Cc: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Subject: Grieg update

HI JF
Would you be available sometime today or tomorrow for a brief chat so I can provide you an update on subject?
I'm acting manager for FPP-RR for a few weeks, and you probably already know from Ray that FPP has taken lead on coordinating all sector comments.
Thanks
Helen

Johnson, Roger

From: Griffiths, Helen
Sent: Wednesday, July 11, 2018 12:12 PM
To: Johnson, Roger
Subject: Re: the latest and greatest

No all good. Just wanted to explain/clarify my comments/questions. If they didn't make any sense for the context, you can ignore them :)

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Wednesday, July 11, 2018 11:51 AM
To: Griffiths, Helen
Subject: RE: the latest and greatest

Changed a few things to address your concerns.

Heard you were looking for me – I also went looking for you.

Will be leaving in a little while [REDACTED] (as discussed) will be available periodically on bb if you need anything

From: Griffiths, Helen
Sent: Wednesday, July 11, 2018 11:39 AM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: the latest and greatest

Nothing shattering there, just a few points of clarification..... [REDACTED]

From: Griffiths, Helen
Sent: July-11-18 11:26 AM
To: Johnson, Roger
Subject: RE: the latest and greatest

s.19(1)

s.21(1)(b)

Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.....will this delay start-up?

- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail. add "Please provide" ??
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document. This is not true?
- **Page 166.** There is no mention lumpfish being assessed as threatened by COSEWIC of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.
- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was assessed designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided

I suspect the COSEWIC "designation" is directly from the CSAS, so leave it as is if that's the case.....in relation to lumpfish and salmon (last 2 comments above)

From: Johnson, Roger
Sent: July-11-18 10:32 AM
To: Griffiths, Helen
Subject: the latest and greatest

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Johnson, Roger

From: Johnson, Roger
Sent: Wednesday, July 11, 2018 12:58 PM
To: Griffiths, Helen; Finn, Ray
Subject: Fw: Extension to Public Review Deadline

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>
Sent: Wednesday, July 11, 2018 12:36 PM
To: Johnson, Roger
Subject: FW: Extension to Public Review Deadline

FYI

From: Squires, Susan [mailto:SusanSquires@gov.nl.ca]
Sent: July-11-18 12:27 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; 'Ginn, Melissa (Melissa.Ginn@tc.gc.ca)'; 'Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA)'; 'Denning, Allison (HC/SC) (allison.denning@canada.ca)'
Cc: Sweeney, Joanne
Subject: Extension to Public Review Deadline

EAC,

The Minister has extended the public review period of the Environmental Impact Statement (EIS) for the Placentia Bay Atlantic Salmon Aquaculture Project until July 25, 2018
(http://www.mae.gov.nl.ca/env_assessment/bulletins/Y2018/20180711.pdf). This is in response to approximately 20 requests received to extend the public review period.

This extension does not change the July 13, 2018 deadline Joanne provided to receive agency comments, nor have we changed the July 31, 2018 ministers decision deadline as to whether or not the project is acceptable.

Kind regards,
Susan

Susan Squires, Ph.D.
Director
Environmental Assessment Division
Department of Municipal Affairs and Environment
Government of Newfoundland and Labrador
709-729-0673
susansquires@gov.nl.ca

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Johnson, Roger

From: Griffiths, Helen
Sent: Wednesday, July 11, 2018 1:16 PM
To: Johnson, Roger
Subject: RE: Greig

Ok, thanks. I'll speak with JF tomorrow at 10am

From: Johnson, Roger
Sent: July-11-18 1:05 PM
To: Griffiths, Helen
Subject: Fw: Greig

Spoke to Tonia this am

She would like a copy of the finalized letter and media lines. Just for fyi

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Tuesday, July 10, 2018 4:12 PM
To: Griffiths, Helen
Subject: Fw: Greig

Who is jf and how do I brief

I can follow up with Tonia -told you she was our contact in NHQ

Let's discuss in am

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Sent: Tuesday, July 10, 2018 4:05 PM
To: Johnson, Roger
Cc: Griffiths, Helen; Hendry, Christopher
Subject: Greig

In addition to briefing JF on Greig please also engage with Tonia Gordanier.
I briefed out on the potentially controversial file on today's NEMO.
Finally let's consider for inclusion in the AES weekly report.

Ray

s.16(2)(c)

(cell)
(709) 772 - 2442. (office)

Johnson, Roger

From: Johnson, Roger
Sent: Wednesday, July 11, 2018 3:06 PM
To: Hendry, Christopher; Griffiths, Helen
Cc: Pilgrim, Bret
Subject: Re: media lines

I agree with Chris but maybe we make a bigger if province approval

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Hendry, Christopher
Sent: Wednesday, July 11, 2018 3:02 PM
To: Griffiths, Helen; Johnson, Roger
Cc: Pilgrim, Bret
Subject: RE: media lines

That last comment is intended to reinforce that even if the project completes the EA process, that is not a green light.

From: Griffiths, Helen
Sent: July-11-18 1:51 PM
To: Johnson, Roger
Cc: Hendry, Christopher; Pilgrim, Bret
Subject: RE: media lines

Last comment assumes project is a go??? Should we, DFO, make a comment that implies or infers that this project will be approved?

From: Johnson, Roger
Sent: July-11-18 9:58 AM
To: Griffiths, Helen
Cc: Hendry, Christopher; Pilgrim, Bret
Subject: media lines

Have taken the liberty of redoing these

Red text -> Helen
Yellow highlight -> Roger
Green highlight -> Chris

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Perry, Jacqueline

From: Finn, Ray
Sent: Wednesday, July 11, 2018 4:46 PM
To: Perry, Jacqueline
Cc: LaRue, Jean-François; Winfield, Nicholas; Griffiths, Helen
Subject: Greig Backgrounder

Jackie – a short summary with some key dates noted

Grieg NL Placentia Bay Project Environmental Assessment

On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment. This action initiated the start of a 50 day public review process and a review by expert departments and agencies including DFO.

DFO initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. This review included a CSAS peer review process by DFO Science (Science Response). DFO will also identify measures to mitigate any adverse effects.

DFO will submit comments to the Environmental Assessment Committee by July 12, who will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal Affairs and Environment. All comments received through this public comment period, including DFO comments, will be posted on the provincial website.

The Provincial Minister of Municipal Affairs and Environment's decision on the acceptability of the EIS is due on July 31, 2018.

The Minister's recommendation to provincial Cabinet is due by August 30, 2018, and Cabinet will inform the proponent of its decision, for which there is no deadline.

Ray Finn
Regional Director / Directeur régional
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada / Pêches et Océans Canada
PO Box 5667 / CP 5667
St. John's NL A1C 5X1 / St. John's T. N.-L. A1C 5X1
Tel | Tél : (709) 772 2442
Fax / Téléc: (709) 772 7862

Johnson, Roger

From: Johnson, Roger
Sent: Thursday, July 12, 2018 8:01 AM
To: Griffiths, Helen
Cc: Hendry, Christopher
Subject: retooled lines
Attachments: media lines RJ.docx

With helen's suggestion

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

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page 1037

Johnson, Roger

From: Griffiths, Helen
Sent: Thursday, July 12, 2018 8:55 AM
To: Johnson, Roger; Decker, Shelley; Pilgrim, Bret
Subject: RE: Grieg Doc and EIS Review Table

I'll drop out after my call

From: Johnson, Roger
Sent: July-11-18 4:47 PM
To: Griffiths, Helen; Decker, Shelley; Pilgrim, Bret
Subject: Re: Grieg Doc and EIS Review Table

Let's have a chat at 0930 and then Helen can join later.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Wednesday, July 11, 2018 4:17 PM
To: Johnson, Roger; Decker, Shelley; Pilgrim, Bret
Subject: RE: Grieg Doc and EIS Review Table

I have a call at 10 for 10-15 minutes or so, otherwise good

From: Johnson, Roger
Sent: July-11-18 2:58 PM
To: Decker, Shelley; Pilgrim, Bret
Cc: Griffiths, Helen
Subject: Re: Grieg Doc and EIS Review Table

Great and yes I fully expect further discussion is required

Perhaps Helen could join us for the latter part of those discussion

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Decker, Shelley
Sent: Wednesday, July 11, 2018 2:45 PM
To: Johnson, Roger; Pilgrim, Bret
Subject: RE: Grieg Doc and EIS Review Table

The EIS review table is complete.

Roger, Bret and I had a discussion this afternoon about the sections covered in the table and how they correspond to our response to the province. I think that we should continue the discussion with you in the morning prior to sending forward.

Shelley

From: Johnson, Roger
Sent: Wednesday, July 11, 2018 2:30 PM
To: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Cc: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: Re: Grieg Doc

Perfect thanks

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Pilgrim, Bret
Sent: Wednesday, July 11, 2018 2:24 PM
To: Johnson, Roger; Decker, Shelley
Subject: Grieg Doc

OK...The latest version of the document file is entitled : *DFO EIS COMMENTS FINIAL JULY 11*. Again, we can change the file name to something more sensible before we ship it back to the province. I've rechecked the document with all the previous versions to ensure all changes were captured. We will work from this version from here on.

Bret

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562

Johnson, Roger

From: Hendry, Christopher
Sent: Thursday, July 12, 2018 10:57 AM
To: Johnson, Roger; Griffiths, Helen
Subject: RE: retooled lines

That looks better to me

From: Johnson, Roger
Sent: July-12-18 10:57 AM
To: Griffiths, Helen; Hendry, Christopher
Subject: RE: retooled lines

Any better

Stella has called asking about these

From: Griffiths, Helen
Sent: Thursday, July 12, 2018 9:54 AM
To: Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>; Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: retooled lines

Maybe "releasing the project from further environmental assessment lies with the Province....." for 2nd last bullet. That make sense? I don't know the EA jargon

From: Hendry, Christopher
Sent: July-12-18 9:36 AM
To: Johnson, Roger; Griffiths, Helen
Subject: RE: retooled lines

I have some minor typographical suggestions. One major comment I have is a seeming disconnection between the two last bullets. The first comments on approval of the project being provincial, but is it an approval, or simply a release from further environmental assessment? If approval, the last bullet seems to contradict that. We can discuss.

C

From: Johnson, Roger
Sent: July-12-18 8:01 AM
To: Griffiths, Helen
Cc: Hendry, Christopher
Subject: retooled lines

With helen's suggestion

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program

Johnson, Roger

From: Squires, Susan <SusanSquires@gov.nl.ca>
Sent: Thursday, July 12, 2018 1:42 PM
To: Johnson, Roger
Cc: Hendry, Christopher; Grant, Carole; Griffiths, Helen; Sweeney, Joanne
Subject: RE: DFO comments Grieg Aquaculture EIS

Thank you Roger. We will be in touch if we have any questions.

Kind regards,
Susan

Susan Squires, Ph.D.
Director
Environmental Assessment Division
Department of Municipal Affairs and Environment
Government of Newfoundland and Labrador
709-729-0673
susansquires@gov.nl.ca

From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Thursday, July 12, 2018 1:37 PM
To: Squires, Susan <SusanSquires@gov.nl.ca>
Cc: Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: DFO comments Grieg Aquaculture EIS

Please see attached the comments from the DFO all sector review of the above mentioned EIS.

I have copied Chris Hendry and Carol Grant as they are the DFO representatives on the EA committee.

Due to the complexity and inaccuracy of the table provided, and the tight timelines, the table provided by the EA Committee chair has not been completed. Please be advised that DFO has reviewed all sections of the EIS that pertain to our mandate.

If you have any questions or comments please feel free to contact me directly.

Thanks

Roger Johnson
Sr. Biologist
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

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No information has been removed or severed from this page

Johnson, Roger

From: Griffiths, Helen
Sent: Thursday, July 12, 2018 1:44 PM
To: Johnson, Roger
Cc: Finn, Ray
Subject: RE: DFO comments Grieg Aquaculture EIS

Excellent! Thanks Roger 😊

From: Johnson, Roger
Sent: July-12-18 1:37 PM
To: Squires, Susan
Cc: Hendry, Christopher; Grant, Carole; Griffiths, Helen
Subject: DFO comments Grieg Aquaculture EIS

Please see attached the comments from the DFO all sector review of the above mentioned EIS.

I have copied Chris Hendry and Carol Grant as they are the DFO representatives on the EA committee.

Due to the complexity and inaccuracy of the table provided, and the tight timelines, the table provided by the EA Committee chair has not been completed. Please be advised that DFO has reviewed all sections of the EIS that pertain to our mandate.

If you have any questions or comments please feel free to contact me directly.

Thanks

Roger Johnson
Sr. Biologist
Fisheries Protection Program
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E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

**Pages 1063 to / à 1075
are duplicates of
sont des duplicatas des
pages 926 to / à 938**

Decker, Shelley

From: Johnson, Roger
Sent: Thursday, July 12, 2018 2:00 PM
To: Pilgrim, Bret; Decker, Shelley
Cc: Gordanier, Tania
Subject: FW: DFO comments Grieg Aquaculture EIS
Attachments: DFO Greig comments.pdf

Bret and Shelly -> great job

Tania -> we are still working on media lines.

From: Johnson, Roger
Sent: Thursday, July 12, 2018 1:37 PM
To: 'Squires, Susan' <SusanSquires@gov.nl.ca>
Cc: Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: DFO comments Grieg Aquaculture EIS

Please see attached the comments from the DFO all sector review of the above mentioned EIS.

I have copied Chris Hendry and Carol Grant as they are the DFO representatives on the EA committee.

Due to the complexity and inaccuracy of the table provided, and the tight timelines, the table provided by the EA Committee chair has not been completed. Please be advised that DFO has reviewed all sections of the EIS that pertain to our mandate.

If you have any questions or comments please feel free to contact me directly.

Thanks

Roger Johnson
Sr. Biologist
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 12, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf of Grieg NL dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another. Additional information is required on mitigation measures to address biosecurity risks associated with the introduction and spread of biofouling invasive species.
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency the cages will be monitored (e.g., monthly, weekly, daily) and whether the ROV will be shared between BMAs.
- **Page xxxi. Assessment Boundaries.** The EIS states that the boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. There is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Studies also exist for migratory movements on the south coast (see Reddin and Lear 1990; Pippy 1982). These studies should be included and discussed. This comment applies to several sections of the EIS and should be clarified throughout the document.
- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided.
- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is confusing as most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of



proposed cage sites and report distance between them and how these distances were calculated. This issue needs to be clarified throughout the document ensuring to include known unscheduled salmon rivers as presented in Table 1 below.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

- **Page xxxiv. Control of Sea Lice.** Please provide a detailed explanation of how proposed mitigation measures such as the use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.
- **Page xxxiv. Effects on Benthic Habitat.** *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* Given the timeline of the currents data used in the study, please clarify how the "not significant" rating was derived.
- **Page xxxv. Fish and Fish Habitat VEC.** The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours.
- **Page xxxvi. Wild Atlantic Salmon VEC.** Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.
- **Page xxxvii.** In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty, please clarify how this conclusion was derived.
- **Page xxxviii. Sensitive Areas VEC.** It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.
- **Page xxxix. Follow-up Monitoring.** Collecting blood samples from salmon within scheduled salmon rivers following an escape event may not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO. These consultations are currently ongoing and should reflex this throughout the EIS.

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Please provide detailed methodology for testing to demonstrate 100% effectiveness.
- **Page 17.** The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit, provide references and clarify for consistency.



2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here.

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, please provide the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland.
- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. What frequency or under what conditions will this happen?
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose.
- **Page 73.** *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* Please provide a detailed explanation of these mitigation responses.
- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for escapes. Additional information should be provided regarding the use of SOPs during this process.

Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.
- **Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency.
- **Page 92.** Other Mitigation Measures. What are the contents of an escape response kit?
- Several times in the document there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *"Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions"*. Please clarify.
- **Page 100.** *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."*. These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.
- **Page 107.** The EIS states *"In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene"*. The statement is incorrect. Security breaches should be handled by the RCMP.



Section 2.8. Accidents and Malfunctions

- **Page 123.** Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear. Please revisit and discuss interaction with lost gear.
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail. Please elaborate.

Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added. Wind direction variability (seasonality) should be better documented.
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014).
- **Page 140.** Wind rose(s) should be added to the discussion on wind direction in Placentia Bay.
- **Page 141.** *"A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period."* A reference should be provided for this statement.

4.2.2. Physical Environment

- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that have been observed and modelled, and which is considered to be the most important issue with respect to the physical environmental assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: *"Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important."* This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone.
- **Page 144.** Wind and Wave Action. Due to its nature, the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used basic bathymetry and coastline (GEBCO and CHS 15s) which limits its applications in coastal areas. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.
- **Page 145.** Flood and Tidal Zones. *"During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights."* A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#))
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document. Please revise for consistency.



- **Page 160. Invasive Species.** The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels.
 2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or will be collected, and it was not discussed in the report.
 3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.
- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

4.2.3. Wild Atlantic Salmon

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.
- **Page 174. Migratory Patterns.** Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater in Newfoundland systems.
- **Page 175. Genetic Population Structure.** The text should be updated to reflect that no diploid escapes were found in 2017.
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015).

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 208.** The statement "currently there is a shift back to a groundfish-based fishery (Fig. 4.17)." is not clear from figure referenced. It's recommended to add other supporting literature.
- **Page 224.** To what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); and to what magnitude?



- **Page 228.** The statement "...and quota adjustments in areas that show a flux in population demographics." should be clarified.

4.4.2.4. Aquaculture

- **Page 251.** Are there recent data for primary product value for mussels post 2007?

4.8. Data Gaps

- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. As the BMAs will not be followed simultaneously, a discussion of potential overall cumulative organic deposition and chemical persistence should be included especially in light of the lack of data on salinity and currents.

Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. "*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*" The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects. Please provide further detail.
- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included. Indirect genetic effects and ecological interactions with wild Atlantic Salmon should also be discussed.
- **Page 363.** "*It is important to consider all of these visual indicators when assessing for impacts of aquaculture since *Beggiatoa* mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016).*" They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016. Please clarify.
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time periods should be identified as *minimum* fallowing times.
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Section 7.1.2.6 Sea Cage Sites (p. 370). Please provide thresholds to be used if known.



Section 7.2. Wild Salmon VEC

- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same applies to Table 7.12 and 7.13.

Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1 highlights potential interactions with lights and fish and fish habitat. However, this is excluded in Table 7.14. Please clarify.

Section 7.7. Accidents and Malfunctions

- **Page 435.** *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify.
- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys.

Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Section 7.9.2. Accidents and Malfunctions

- **Page 480.** It is unlikely that the residual effects would be "not significant". Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) should be discussed in more detail.

Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.
- **Page 4, Para. 2.** Please correct the statement that *"after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat..."* as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).
- **Page 36.** It states that *"the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages"* and that this could affect migration patterns if wild salmon "choose to



travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey." This should be discussed in the main EIS document.

- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

- The document cites improved triploidy induction method but data is not provided nor does it appear to be published. Sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Please clarify.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

- **Page 31.** It states that *"if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented."* This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals.
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.
- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.
- **Page 32** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).
- **Page 33.** Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

- The ocean current time-series used for this study are too short to provide statistically robust estimates of dispersion. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance of low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Other time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012)

Appendix D – Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites



- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008). Please revise.
- **Page 28.** *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).
- **Page 36.** *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."*
- **Page 36.** The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons. Please clarify.
- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data reports: Hart et al. 1999; Schillinger et al. 2000).
- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although it's long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area should be referenced and discussed.

Thank you for providing the opportunity to review and provide comment on this project EIS Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca.).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Decker, Shelley

From: Johnson, Roger
Sent: Friday, July 20, 2018 2:03 PM
To: Pilgrim, Bret; Decker, Shelley
Subject: FW: DFO comments Grieg Aquaculture EIS
Attachments: EA comments _DFO EIS review.doc; EAC Guidelines.pdf

From: Johnson, Roger
Sent: Friday, July 20, 2018 2:02 PM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Subject: FW: DFO comments Grieg Aquaculture EIS

I was not aware that we were to provide recommendations on whether this project should go ahead – I was under the impression that was the job of the EA committee chair (province).

The province has concerns that the amount of clarification we have required will require they tell the proponent to submit an “addendum to the EIS” ??

Any thoughts?

Sorry to bother you [REDACTED] and perhaps I will just hang on to this until Monday (it being 2 pm) and take it up with your “replacement” on Monday.

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Friday, July 20, 2018 12:36 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>
Subject: RE: DFO comments Grieg Aquaculture EIS

Dear Roger,

Thank you for your July 12, 2018 submission of the DFO all-sector review comments regarding the EIS for the Placentia Bay Atlantic Salmon Aquaculture Project. Please note that it is the responsibility of each EAC member to provide professional advice to the EAC Chair, within the context of their agency's mandate, regarding the adequacy of assessment documents and to recommend whether the undertaking being assessed should proceed or not based on its environmental acceptability (see attached Guidelines for EAC which was provided to each EAC member upon appointment by the MAE Minister). DFO has provided a detailed analysis of the EIS, but has not recommended whether: (i) the EIS is acceptable; and (ii) whether the project can proceed in an environmentally acceptable manner. Please review my comments on the attached DFO submission and identify the questions and/or comments posed by DFO that constitute a request for more information at a level of concern that would prevent DFO from making a recommendation as to whether the project can proceed in an environmentally acceptable manner.

It would be appreciated if you would provide your response to me by 4:00pm Monday, July 23, 2018, prior to the EAC meeting on Tuesday morning. Please call me at 729-2822 or send me an email if you have any questions or concerns.

Regards,

s.19(1)

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 12, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project*

As requested, Fisheries and Oceans Canada (DFO) has completed a review of the document entitled "***Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project***" submitted on behalf of Grieg NL dated May 25, 2018 and offers the following comments for your review and consideration.

Executive Summary

- **Page xxix. Sea Cage Sites.** *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another. Additional information is required on mitigation measures to address biosecurity risks associated with the introduction and spread of biofouling invasive species. (To be referred to proponent for response. Please indicate whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxx. Sea Cage Sites.** The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency the cages will be monitored (e.g., monthly, weekly, daily) and whether the ROV will be shared between BMAs. (To be referred to proponent for response. Please indicate whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxxi. Assessment Boundaries.** The EIS states that the boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. There is good evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon are caught within the bay. Studies also exist for migratory movements on the south coast (see Reddin and Lear 1990; Pippy 1982). These studies should be included and discussed. This comment applies to several sections of the EIS and should be clarified throughout the document. (To be referred to proponent for response. Please indicate whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).



- **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided. (See EIS 2.5.2.2 pg 95-96, and appendix I, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxxiv.** Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is confusing as most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them and how these distances were calculated. This issue needs to be clarified throughout the document ensuring to include known unscheduled salmon rivers as presented in Table 1 below. (Please see the Wild Atlantic Salmon Component Study, section 4.4, pg 15-17, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

- **Page xxxiv. Control of Sea Lice.** Please provide a detailed explanation of how proposed mitigation measures such as the use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice. (Please see the Wild Atlantic Salmon Component Study, (5) Sea Lice Control - pg 50-51 section, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxxiv. Effects on Benthic Habitat.** "Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)." Given the timeline of the currents data used in the study, please clarify how the "not significant" rating was derived. (Please see the Wild Atlantic Salmon Component Study, section 4.7, pg 30 - 37, including figures 4.7 - 4.17, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxxv. Fish and Fish Habitat VEC.** The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This will require constant monitoring of the fish behaviours. (Please see the Wild Atlantic Salmon Component Study, Section 4.8.2 #1, pg 46, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxxvi. Wild Atlantic Salmon VEC.** Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived. (Please see the Wild Atlantic Salmon Component Study, section 4.1.5 Abundance, pg 5, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).



- **Page xxxvii.** In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term"*. This is not known and the statement does not reflect the large amount of uncertainty, please clarify how this conclusion was derived. (Please see the EIS, section 7.0 - 7.4.3.3 pg 354 – 413, including tables 7.1- 7.16, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxxviii.** Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested. (Please see the EIS, section 7.4, pg 403, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page xxxix.** Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event may not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO. These consultations are currently ongoing and should reflex this throughout the EIS. (The information could be included in an EEMP, which would be required as a potential condition of release for approval by the EAC prior to the commencement of project activities, should that be the course of action taken).

Section 2.0. The Proposed Undertaking

2.4.1. Project Rationale

- **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Please provide detailed methodology for testing to demonstrate 100% effectiveness. Please see the EIS, section 2.5.2.2 pg 95-96, and appendix I, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 17.** The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit, provide references and clarify for consistency. (On pg 17 the Cotter and Fjelldal studies show triploids (male and female) are less likely to migrate to freshwater and attempt to spawn than diploids. The Cotter et al. study indicates female triploid Atlantic salmon do not exhibit sexual maturation or spawning behaviour. Grieg is inferring in the executive summary that sterile triploid females will not mature (sexually) or possess a desire to migrate to freshwater, as stated on pg 17. Please advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

2.4.3. Land-based Facility (RAS hatchery)

- **Page 29.** The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here. (Please see appendix I, pg 29 and advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

2.4.4. Sea Farms

- **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, please provide the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. (Would this validate/discredit the performance of the Aqualine Midgard net? This information was not required by the EIS guidelines.)



- **Page 52.** Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. What frequency or under what conditions will this happen? (Please see Sea Cage Maintenance, pg 69-70 and advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 64.** *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 73.** *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* Please provide a detailed explanation of these mitigation responses. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 75.** Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for escapes. Additional information should be provided regarding the use of SOPs during this process. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Section 2.5. Monitoring and Mitigation Measures

- Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 91.** Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p. 53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency. (Page 53 does not refer to nets older than 3 years. Is there a regulatory requirement to be met by the proponent?)
- **Page 92.** Other Mitigation Measures. What are the contents of an escape response kit? (This may be included in an EPP, which would be required by a potential condition of release should that be the course of action taken).
- Several times in the document there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *"Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions"*. Please clarify. (To be referred to proponent for response. Please advise whether DFO requires this clarification to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 100.** *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."*. These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is



recommended. (This information may be required as a potential condition of release, should that be the recommended action. Could also require that this information be made publicly available).

- **Page 107.** The EIS states "*In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene*". The statement is incorrect. Security breaches should be handled by the RCMP. (This could be included as advice to the proponent in a potential letter of release, should that be the recommended action).

Section 2.8(?). Accidents and Malfunctions

- **Page 123.** Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear. Please revisit and discuss interaction with lost gear. (This information was not required by the EIS guidelines. Please advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 124.** Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail. Please elaborate. (Please review section 7 of the EIS and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Section 4.0. Existing Environment

4.1.2. Climate and Meteorology

- **Page 139.** Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added. Wind direction variability (seasonality) should be better documented. (Please review section 2.3 and section 3 of appendix V and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 140.** Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). (Please review section 3 of appendix V and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 140.** Wind rose(s) should be added to the discussion on wind direction in Placentia Bay. (Please review section 3 of appendix V and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 141.** "A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period." A reference should be provided for this statement. (Please see section 2.7.4, pg 33 of appendix V and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.2. Physical Environment

- **Page 143.** Ocean Currents. This section fails to describe the variability of the currents that have been observed and modelled, and which is considered to be the most important issue with respect to the physical environmental assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: "*Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important.*" This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone.



(Please review appendix V, pgs 36–43, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

- **Page 144.** Wind and Wave Action. Due to its nature, the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used basic bathymetry and coastline (GEBCO and CHS 15s) which limits its applications in coastal areas. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 145.** Flood and Tidal Zones. *“During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.”* A surge value of 0.93 m is reported on page 67 of Appendix D (Reference should be Appendix V). Please revisit and provide the correct value. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Fish and Fish Habitat

- **Page 154.** Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see [Bedford Institute of Oceanography's Oceanographic Databases](#); and [DFO's Marine Environmental Data Section](#)). (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 154.** Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 160.** Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document. Please revise for consistency. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 160.** Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels.



2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or will be collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

(To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

- **Page 166.** There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard. (Although not included here, the lumpfish is listed as threatened under COSEWIC in table 4.14, pg 177). Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Wild Atlantic Salmon

- **Page 173.** The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 174.** Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater in Newfoundland systems. (This information may be provided to the proponent in a potential letter of release, should that be the course of action taken).
- **Page 175.** Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017. (This information may be provided to the proponent in a potential letter of release, should that be the course of action taken).
- **Page 175.** The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015). (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.4.2.3. Domestic Fisheries in the Study Area

- **Page 208.** The statement "*currently there is a shift back to a groundfish-based fishery (Fig. 4.17).*" is not clear from figure referenced. It's recommended to add other supporting literature. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 224.** To what extent does Atlantic cod harvesting overlap with proposed cage sites (last paragraph); and to what magnitude? (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).



- **Page 228.** The statement "...and quota adjustments in areas that show a flux in population demographics." should be clarified. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.4.2.4. Aquaculture

- **Page 251.** Are there recent data for primary product value for mussels post 2007? (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.8. Data Gaps

- **Page 344.** Fish and Fish Habitat. Data gaps exist regarding cumulative effects. As the BMAs will not be followed simultaneously, a discussion of potential overall cumulative organic deposition and chemical persistence should be included especially in light of the lack of data on salinity and currents. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Section 6.0. Effects of the Environment on the Project

- **Page 351.** Superchill. "Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3)." The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland. (This information may be provided to the proponent in a potential letter of release, should that be the course of action taken).
- **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Section 7.0. Effects of the Project on the Environment

Section 7.1. Fish and Fish Habitat VEC

- **Page 354.** There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance. (Please review section 7.71 pg 431 and tables 7.20 – 7.22 and advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 360.** Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects. Please provide further detail. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).



- **Page 362.** Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included. Indirect genetic effects and ecological interactions with wild Atlantic Salmon should also be discussed. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 363.** *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)."* They are likely not *Beggiatoa* mats as reported in Verhoeven et al. 2016. Please clarify. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 364.** When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time periods should be identified as *minimum* fallowing times. . (This information may be provided to the proponent in a potential letter of release, should that be the course of action taken).
- **Page 369.** Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Section 7.1.2.6 Sea Cage Sites (p. 370). Please provide thresholds to be used if known. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Section 7.2. Wild Salmon VEC

- **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects. . (Please review section 7.71 pg 431 and tables 7.20 – 7.22 and advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same applies to Table 7.12 and 7.13. (Please review sections 2.8.5 pg 123 (This information was not required by the EIS guidelines. Please advise whether this information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).



Section 7.4. Sensitive Areas VEC

- **Page 404.** Table 7.1 highlights potential interactions with lights and fish and fish habitat. However, this is excluded in Table 7.14. Please clarify. *Section 7.7. Accidents and Malfunctions* (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 435.** “Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.” This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify. (Please review pgs 7, 8 and 11 of the Wild Atlantic Salmon Component Study and advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 435.** Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated. (To be provided to proponent).
- **Page 436.** The EIS document seems to mix-up juvenile and adult surveys. Also, the statement “older individuals” is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d’Espoir in the fall 2017 surveys. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Section 7.8. Follow-up Monitoring

- **Page 475.** Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions. (This information may be included in an EEMP required by a potential condition of release, should that be the recommended action).

Section 7.9.2. Accidents and Malfunctions

- **Page 480.** It is unlikely that the residual effects would be “not significant”. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) should be discussed in more detail. (Please review pgs 7, 8 and 11 of the Wild Atlantic Salmon Component Study and advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Component Study: Wild Atlantic Salmon

- **Page 1, Para. 2.** The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here. (Please review section 4.3, pg 12 of the Wild Atlantic Salmon Component Study and advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).



- **Page 4, Para. 2.** Please correct the statement that “*after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...*” as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 10, Para. 1.** DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018). (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 36.** It states that “*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*” and that this could affect migration patterns if wild salmon “*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey.*” This should be discussed in the main EIS document. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 55.** Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc. (This information may be included in an EEMP required by a potential condition of release, should that be the recommended action).

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

- The document cites improved triploidy induction method but data is not provided nor does it appear to be published. Sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Please clarify. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

- **Page 31.** It states that “*if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented.*” This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. (This may be required as a potential condition of release, should that be the course of action taken).
- **Page 32, Para. 2.** It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure



any adverse effects on wild salmon are minimized. (This information may be provided to the proponent in a potential letter of release, should that be the course of action taken).

- **Page 32, Para. 3.** The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set. (This may be included in an EPP, which would be required by a potential condition of release should that be the course of action taken).
- **Page 32** The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon). (This recommendation may be included in a potential release letter, should that be the course of action taken).
- **Page 33.** Appendix 8 appears to be missing. (Pg 33 references appendix 8 of the Code of Containment).

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

- **The ocean current time-series used for this study are too short to provide statistically robust estimates of dispersion. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance of low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Other time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012).** (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Appendix D – Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

- All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008). Please revise. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 28.** *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms*



crossing on a more west-east track." The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

(To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

- **Page 36.** *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 36.** The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons. Please clarify. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 36.** Please provide references for the datasets that have already been documented (e.g. Memorial University data reports: Hart et al. 1999; Schillinger et al. 2000). (To be provided to proponent).
- **Page 36.** It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 38.** *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although it's long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
- **Page 63.** A more recent paper by Ma et al. (2017) on surge in the Study Area should be referenced and discussed. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

Thank you for providing the opportunity to review and provide comment on this project EIS Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca.).



Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

ENVIRONMENTAL ASSESSMENT

GUIDELINES

FOR

ENVIRONMENTAL ASSESSMENT

COMMITTEE

November 2017

INTRODUCTION

The Environmental Assessment Division of the Department of Municipal Affairs and Environment is charged with coordinating the implementation of Part X of the Environmental Protection Act. There is provision in the Act for the minister to appoint assessment committees composed of one representative from each department or agency of government having an interest in a particular undertaking. **The role of the committee is to develop project guidelines; to provide scientific, technical, and professional advice to the minister regarding the adequacy of documents (component studies, environmental preview reports, environmental impact statements), and recommend whether proposed projects should proceed based on their environmental acceptability.**

The following guidelines should assist members while serving on assessment committees.

CHAIRPERSON'S RESPONSIBILITIES

1. The minister shall appoint a chairperson who shall be responsible for the coordination of the work of the assessment committee.
2. Within the context of the legislative and policy mandate of the environmental assessment process, the chairperson shall maintain an active, unbiased, and facilitative role in the deliberations of the assessment committee.
3. The chairperson arranges meetings for the assessment committee. The proponent is invited to attend meetings as appropriate and the assessment committee may meet privately for internal discussions. Typically, meetings are scheduled for the following events:
 - initial familiarization meeting where the role and conduct of the committee shall be clearly explained, where environmental issues are identified and discussed, and where a determination is made as to whether the necessary scientific expertise and technical skills are possessed by committee members or accessible to the committee. A recommendation may be forwarded to the minister to employ an expert reviewer(s) if one or more relevant areas of expertise or skills are not represented on the committee;
 - a scoping meeting of the committee and the proponent where the proponent will present a description of the undertaking and the rationale/need for the undertaking, where the requirements of the Act are clearly communicated to the proponent, and where the issues identified by the committee are discussed with the proponent;
 - following the receipt and/or review of component studies, EPR's and EIS's if required to address issues and to resolve conflicts;
 - at any time during the EA process to address outstanding issues as required.

4. The chairperson works to ensure that issues discussed during meetings are relevant to the EA process.
5. The chairperson works to achieve consensus and resolve conflicts among assessment committee members and/or the proponent.
6. The chairperson prepares draft reports based on a synthesis of assessment committee and public comments that recommend courses of action to the minister. The draft reports are circulated to the members for their review and verification. The chairperson seeks committee consensus before submitting the final report to the minister. The final report is presented to the minister with recommendations and clearly identified dissenting opinions. If a consensus cannot be reached, the chairperson evaluates the different positions and makes a recommendation regarding the course of action for the minister.
7. The chairperson, or more senior departmental official, shall make any public statements concerning the work of the assessment committee, as appropriate.

MEMBER'S RESPONSIBILITIES

1. The Minister of Municipal Affairs and Environment shall appoint as members to an assessment committee, those individuals nominated by the deputy minister (or equivalent position) of the department or agency expressing an interest in a particular undertaking. Each member will represent a unique mandate that is relevant to the undertaking being assessed.
2. The role of each member is to assist in the development of guidelines, to provide scientific, technical, and professional advice within the context of their agency's mandate regarding the adequacy of assessment documents and, to recommend whether the undertaking being assessed should proceed or not based on its environmental acceptability.
3. The members shall conduct themselves according to the highest standards of their profession and in keeping with the Oath/Affirmation of Office, signed upon entering the public service.
4. The members shall respect the committee's main communication channel through the chairperson, to the minister, regarding their deliberations in committee and subsequent communication with their respective executive officers and advisors.
5. While the primary role of the members is to provide advice within the context of their agency's mandate, the member should also make every effort to attend to their role as problem-solvers in committee tasks. Rather than maintaining an inflexible position, members should strive to remain open minded about seeking novel solutions to real problems, and to considering proposals brought forward by the proponent.

REVIEW PROCEDURES

1. The meetings of assessment committees shall be in private and the proceedings shall be confidential. The committee may wish to consult with the proponent, technical experts, or other individuals, which invitation shall be issued by the chairperson.
2. Internal correspondence pertaining to the work of the committee shall be confidential and shall be shown only to senior officers and advisors of the members' respective departments or agencies.
3. External correspondence regarding environmental assessment and pertaining to the committee shall be addressed to the minister.
4. Members will assist in the development of guidelines for EPR's and EIS's. The time frames are 60 days for the development of EPR guidelines and 120 days for the development of EIS guidelines, starting from the date of the minister's decision to call for an EPR or EIS.
5. Members shall review draft and final component studies and shall, within 30 days of receipt, present written comments to the chairperson on the scientific and technical accuracy and adherence to the guidelines of such studies.
6. Members shall review the EIS for adherence to the guidelines and shall, within 45 days of receipt, provide written comments to the chairperson on such evaluation and a written opinion whether the EIS is satisfactory. In cases where a member is of the opinion that the EIS is unsatisfactory, the member shall provide written recommendations to the chairperson concerning the measures which must be taken by the proponent to render the EIS satisfactory.
7. Members shall review the EPR for adherence to the guidelines and shall, within 30 days of receipt, provide written comments to the chairperson on such evaluation and a written opinion whether the EPR is satisfactory. In cases where a member is of the opinion the EPR is unsatisfactory, the member shall provide written recommendations to the chairperson concerning the measures which must be taken by the proponent to render it satisfactory.
8. The chairperson shall prepare a draft report of the committee based on a synthesis of the comments emanating from the review and shall incorporate all points of view therein. This draft shall be circulated among the members for their final input and verification. A meeting may be called to achieve this objective.
9. The final report of the assessment committee shall be delivered to the minister by the chairperson and copies shall be forwarded simultaneously to the members.
10. The chairperson shall prepare a list of recommendations resulting from the committee's review and shall seek consensus on such recommendations before submitting them to the minister. Dissenting opinions shall be clearly identified within.

11. Members are cautioned that the report of the assessment committee and the recommendations are not available for public distribution in accordance with the provisions of Access to Information legislation.

NON-COMPLIANCE

1. Any member who fails to abide by these guidelines may be dismissed from the assessment committee. The minister shall then ask the respective agency to nominate a new member to the committee.

WAIVER OF REQUIREMENTS

1. The chairperson, with the consent of the minister, may waive any or all of the proceeding requirements in order to expedite the functioning of the assessment committee.

Decker, Shelley

From: Johnson, Roger
Sent: Friday, July 20, 2018 2:05 PM
To: Pilgrim, Bret; Decker, Shelley
Subject: FW: EIS review comments
Attachments: EIS Review_WRMD.pdf; EIS Review_TCII.pdf; EIS Review_ECCC.pdf; EIS Review_DFO.pdf; EIS Review_HC.pdf; EIS Review_FLR.pdf; EIS Review_PPD.pdf; EIS Review_TC.pdf

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Friday, July 20, 2018 1:23 PM
To: Hanchar, Dorothea <DorotheaHanchar@gov.nl.ca>; Ficzero, Vicki <vickificzero@gov.nl.ca>; Angelopoulos, John <johnangelopoulos@gov.nl.ca>; Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Adams, Blair <BlairAdams@gov.nl.ca>; kawaja, jonathan <jonathankawaja@gov.nl.ca>; Whelan, Dr. Daryl S <DarylSWhelan@gov.nl.ca>; Ginn, Melissa (Melissa.Ginn@tc.gc.ca) <Melissa.Ginn@tc.gc.ca>; Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA) <Jerry.Pulchan@EC.GC.CA>; Denning, Allison (HC/SC) (allison.denning@canada.ca) <allison.denning@canada.ca>
Cc: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>; Squires, Susan <SusanSquires@gov.nl.ca>
Subject: EIS review comments

Hi All,

I've attached the EIS review comments from all EAC members for your review. We'll discuss these comments and formulate some thoughts on a recommendation to the minister during our meeting Tuesday morning. I hope to circulate consolidated public comments early next week for your review.

Please call me at 729-2822 or send me an email if you have any questions or concerns.

PS – If you haven't already replied to the request for a meeting Tuesday, July 24, 2018, from 9:00am -12:30, please do so asap. The meeting request was emailed to you on July 17, 2018.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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EIS REVIEW

Placentia Bay Atlantic Salmon Aquaculture Project (1834)

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
2.1 Study Areas		
a.	JA,BA, CG	
b.	JA, JP, MG	
c.	CH, CG, BA, JK, MG, JP	
d.	JA, DH , VF, JK	Acceptable
e.	CH, CG, JK, BA	
f.	JA, JK, BA, CH, CG	
g.	DW, JK, CH, CG	
2.2 Rationale for the Undertaking		
1 st bullet	All (DH)	No local market anticipated (i.e. all fish for export). (Note: any risk of change to US market due to changes in NAFTA/tariffs?)
2 nd bullet	All (DH)	Acceptable
3 rd bullet	All (DH)	Acceptable
4 th bullet	All (DH)	Acceptable
5 th bullet	All (DH)	Acceptable
2.3.1 General Layout		
a.	All	
b.	DH , VF, JP	Acceptable
c.	JP, AD, VF, MG	
d.	JP,JS	
e.	CH, CG, JK, BA, JP	
f.	JA, CH, CG, JK, BA, JP, MG	
g.	CH, CG, JK, BA, JP, MG	
2.3.2 Construction		
a.	DW, JK	
b.	JP, DH	acceptable
c.	JP, JS	
d.	JP, DH	Acceptable
e.	JP, CH, JK, DW	
f.	JP, DH , MG	Acceptable
g.	JP, AD, MG	
h.	JP, VF, JS, AD	
i.	JS	
j.	AD, VF, MG, JP	

k.	VF, JP, JK, AD	
l.	JP, VF, BA, CG	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
2.3.3 Operation and Maintenance		
a.	DW,JK,CH, DH ,VF	Acceptable
b.	DW, JK, CH, BA, CG	
c.	DW, JK, CH	
d.	DW, JK, CH, BA, CG	
e.	DW, JK, CH, BA, CG	
f.	DW, JK, CH, BA, CG, JP	
g.	DW, JK, CH, BA, CG, MG	
h.	DH	

i.	DE	

j.	DW, JK, CH	
k.	DW, JK, CH, VF, JP	
l.	DW, JK, CH, BA, CG, MG, VF, JP	
m.	DW, JK, CH, BA, CG, MG, JA, JP	
n.	DW, JK, CH, BA, CG, MG, AD, JP	
o.	DW, JK, CH, BA, CG, MG, AD, JP	
p.	DW, JK, CH, BA, CG, MG, VF, JP	
q.	JK, CH, BA, CG, MG, VF, JP, AD, JA	
r.	VF, AD, JP, JK, CH, DW	
s.	DW, AD, JP	
t.	AD, DW, CH, JK, JP	
u.	AD, DW, CH, JK, VF, JP	
v.	VF, JP, AD	
w.	VF, JP, AD, CH, JK, BA, CG	
x.	JP, VF, MG	
y.	JK, CH, MG, VF, JP, BA, CG, DH	Acceptable
z.	AD, JK, CH, BA, CG, JP	
aa.	JS	
2.3.4 Decommissioning and Rehabilitation		
a.	JK, JS	
b.	JS	
c.	JK, CH, CG, BA, MG, JP	
d.	CH, CG, BA, MG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/
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		Deficient/ N/A*
2.3.5 Regulatory Frame work		
a.	All	Acceptable
b.	All	Acceptable
c.	All	Acceptable
3.1 Alternatives to the Undertaking		
a.	JK, BA, CH, CG, JS, AD, MG	
b.	JK, BA, CH, CG, JS, AD, MG	
3.2 Alternative Methods of Carrying Out the Undertaking		
a.	JK, BA, CH, CG, JA, MG	
b.	JK, BA, CH, CG, JA	
c.	JK, BA, CH, CG, VF	
d.	JK, BA, CH, CG, TC, EC	
4.1 Key Issues		
1 st bullet	All	Deficient: While the use of sterile triploid Atlantic salmon would work towards preserving the genetic integrity and biological fitness of wild Atlantic Salmon, the potential adverse effect of the presence of the sea cages in and of themselves has not been satisfactorily addressed. While the assurance of no escapes is admirable, there is no detailed analysis of how the cages themselves could potentially affect wild salmon through factors that could include changes in predator behavior and occurrence (and the stress of this increase on wild populations), or the detriment of success to Placentia Bay – if Grieg's operation is successful, what, if any, safeguards would be implemented to ensure that the Bay is not over subscribed with

		additional farm sites?
2 nd bullet	All	acceptable
3 rd bullet	All	acceptable
4 th bullet	All	Acceptable
4.2.1 Atmospheric Environment		
a.	CH, CG, JK, BA, JP	
b.	CH, CG, JK, BA, JP	
c.	JP, AD, VF, JS	
d.	JP, AD, VF	
4.2.2 Aquatic Environment		
a.	JK, BA, CH, CG	
b.	JK, BA, CH, CG, JP, MG	
c.	JK, BA, CH, CG, JP	
d.	BA, CG, JP	
e.	JK, BA, CH, CG, JP	
f.	JK, BA, CH, CG, JP, MG	
g.	JK, BA, CH, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.2.3 Terrestrial Environment		
a.	JP, BA	
b.	DH	

c.	DH	
d.	DH	
e.	JP, BA	
f.	JP, BA	

g.	JP, BA	
h.	DW, BA, JK	
4.2.4 Land and Resource Use		
a.	CH, CG, JK, BA, JA	
b.	JA, CH, JK	
c.	JA, MG, JK, CH	
d.	BA, CG, JA	
e.	JA	
4.2.5 Heritage Resources		
a.	JA, JS	
b.	JA, JS	
c.	JA, JS	
d.	JA, JS	
4.2.6 Communities		
a.	JA, AD	
b.	JA, AD	
c.	JA	
d.	JA, JS	
e.	JA	
4.2.7 Economy, Employment, and Business		
a.	JA	
b.	JA	
c.	JS	
d.	JA	
e.	JA, JS	
f.	JA	

*Please provide rationale on an additional page, where applicable.

COMPONENT STUDIES

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.1 Component Study – Wild Atlantic Salmon		
a.	CG, BA, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, BA, CG, JK, CH	
d.	CG, BA, CH, JK	

e.	CH, CG, JK. BA, JP, MG	
f.	CH, CG, JK. BA, JP, MG	
g.	CH, CG, JK. BA, JP, MG	
h.	DW, JK, BA, CH, CG, JP, AD, MG, VF	
i.	DW, VF, AD, TC, JP	

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
4.3.2 Component Study – Fish and Fish Habitat		
a.	CG, BA, JP, CH, JK	
b.	CG, BA, JP, MG, JK, CH	
c.	CG, BA, JP, MG, CH, JK	
d.	CH, JK, DW, JP	
e.	CH, CG, JK, BA, JP, MG	
f.	CH, CG, JK. BA, JP, MG	
g.	DW, VF, AD, JK, CH, TC, JP, BA, CG	

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
4.3.3 Component Study – The Cultural, Recreational, and Commercial Importance of the Waters of Placentia Bay		
a.	CH, CG, JA, MG	
b.	JA	
c.	MG, JA, CH, CG, BA, JP	
d.	CG, BA, JP, JA, CH, JK	

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
4.3.4 Component Study – Aqualine Midgard Sea-Cage Study		
a.	CH, JK, CG, BA	
b.	CH, JK, CG, BA	
c.	CH, JK, CG, BA, JP, MG	
d.	CH, JK, CG, BA, JP	
e.	CH, JK, CG, BA, JP	
EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
5.0 Data Gaps	All	Deficient: While the proponent identifies some significant data gaps, especially with regards to wild salmon stock and fish and fish habitat, there does not

		appear to be any proposed mitigation for addressing these deficiencies.
6.1 Predicted Future Condition of the Environment if the Undertaking Does Not Proceed	All	Deficient – It does not appear as if this was addressed in the sections that the proponent suggests deals with this requirement.
6.2 Predicted Environmental Effects of the Undertaking		
a.	CG, BA, CH, JK, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, CG, BA, CH, JK	
d.	CG, BA, CH, JK, DW	
e.	JP, CG, BA	
f.	CG, BA, CH, JK, DW, AD, VF	
g.	CG, BA, CH, JK, JP, DW	
h.	CH, CG, MG, JA, JP	
i.	JA	
j.	BA, CG, CH, JK, MG, JP	
k.	JP, BA	
l.	CH, JK, JA	
m.	VF, JP	
n.	VF, JS, JP, AD	
6.3 Accidents and Malfunctions		
a.	BA, CG, CH, JK	
b.	VF, JK, DW, CH, JP, AD	
c.	CH, JK, DW, BA, CG, AD, VF, JP	
d.	JK, DW, DH	
e.	CH, JA, MG, JK, JP	
f.	All	
6.4 Cumulative Environmental Effects		
a.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
b.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
c.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
d.	JS, AD, MG, JK, CH, JA, BA, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
6.5 Effects of the Environment on the Project	All	
7.1 Mitigation		
a.	CH, CG, JK, BA, MG	
b.	CH, CG, JK, BA	
c.	CH, CG, JK, BA	
d.	CH, CG, JK, BA	
e.	CH, CG, JK, BA	
f.	CH, CG, JK, BA, JP	
g.	CH, CG, JK, BA, JP, DW	
h.	CH, CG, JK, BA, DW	
i.	CH, CG, JK, BA, DW	
j.	CH, CG, JK, BA, DW	
k.	CH, CG, JK, BA, DW	
l.	DW, AD, VF, JP, CH, JK, CG, BA	
m.	DW, CG, BA, CH, JK, JP	
n.	CH, JK, DW, BA, CG, JP, AD, VF	
o.	JK, DW, CH, AD, VF, JP	
p.	BA, CG, CH, JK, MG, JP	
q.	CG, BA, JK, CH, JP, JA	
r.	JK, DW, CH, AD, JP	
s.	JS, JP, VF, AD	
t.	JP, BA	
7.2 Emergency Response/Contingency Plans		
a.	VF, JP, MG, DH	Deficient – from a source water perspective, the proponent does not address what a response plan/contingency plan would be in place to deal with a catastrophic failure of the groundwater water supply with regards to the hatchery operations and smolt health.
b.	All	
c.	VF, AD, JP, JK, CH, DW	
d.	JK, CH, CG, BA, JP	
e.	DW, JK, CH, AD, VF, JP	
7.3 Waste Management Plan		

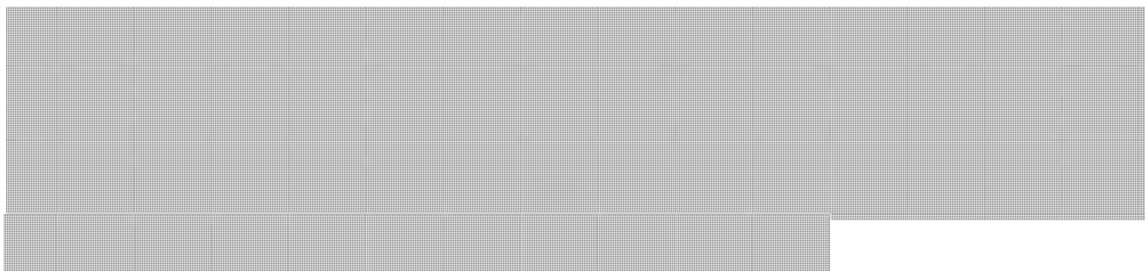
a.	VF, JP, AD	
b.	VF, DW, JP, AD, JK, CH, DH	N/A
c.	VF, JP, AD, DH, MG	N/A
d.	CH, JK, JP, MG, JA	
e.	JK, CH, JP, CG, BA, JP, DW	
f.	JK, CH, CG, BA, JP	
g.	VF, DH, JP, CG, BA	Acceptable
h.	VF, JP, JK, AD, JS	
EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
7.4 Environmental Effects Monitoring and Follow-up Program (EEMP)		
a.	CG, BA, JK, CH, DW, JP	
b.	CG, BA, JK, CH, DW, JP	
c.	BA, JK, CH, DW, JP	
d.	CG, BA, JK, CH, DW, JP	
e.	CG, BA, JP	
f.	CH, JK, CG, BA, JP	
g.	DH	
h.	CH, CG, JK, BA, JP	
8.0 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE	All	
9.0 ASSESSMENT SUMMARY AND CONCLUSIONS	All	
10.0 PUBLIC PARTICIPATION	JS	
11.0 ENVIRONMENTAL PROTECTION PLAN (EPP)	All	
13.0 PERSONNEL	All	
14.0 COMMITMENTS MADE IN THE EIS	All	
15.0 COPIES OF REPORTS	JS	

*Please provide rationale on an additional page, where applicable.

EIS OPINION:

s.13(1)(c)

Thank you for the opportunity to review this document. My comments are in the sections above.



Name: Dorothea Hanchar

Date: July 17, 2018

s.13(1)(c)

From: Hanchar, Dorothea
Sent: Tuesday, July 17, 2018 11:48 AM
To: Khan, Haseen; Sweeney, Joanne; Squires, Susan
Subject: RE: EIS Review_DWH.docx

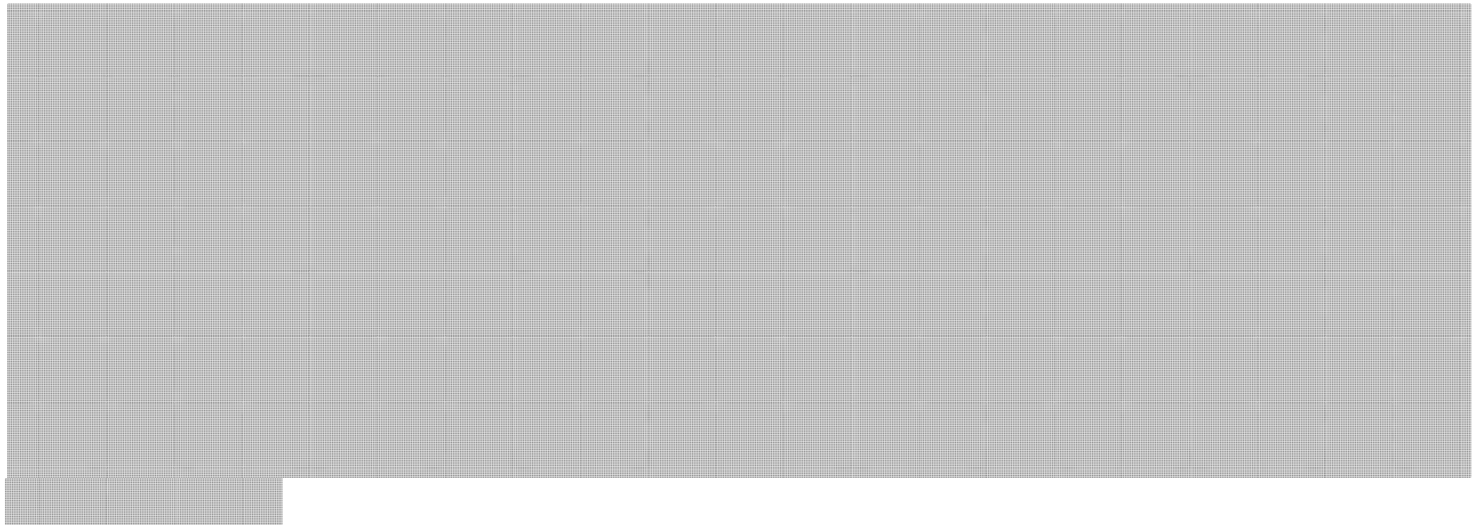
Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Purple Category

Thanks, Haseen –

You are correct in your summary of my comments.

Further your comments, below is my input :



Please let me know if you require any further information

Dorothea

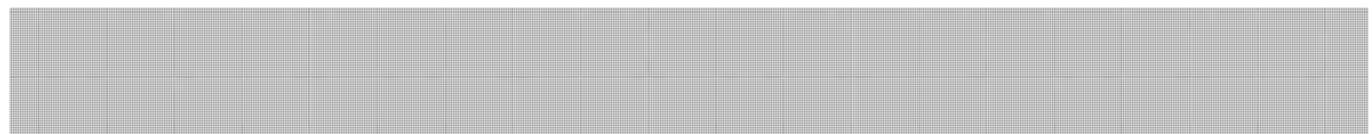
s.13(1)(c)

From: Khan, Haseen
Sent: Tuesday, July 17, 2018 10:27 AM
To: Hanchar, Dorothea; Sweeney, Joanne; Squires, Susan
Subject: RE: EIS Review_DWH.docx

Dorothea;

Thanks for your review. Is the following accurate summary of your review comments? This may be useful to Susan/Joanne for briefing to the DM.

Based on the review of your review comments my conclusions is that report is deficient in terms of:



I think we should provide some input on the following two points:

3. What are our bottom lines in terms of information and commitment for the project to move ahead??
4. What are the good points in the report from water resources perspective?.

Haseen Khan, P.Eng.
Director
Water Resources Management Division
Department of Municipal Affairs and Environment
4th Floor, Confederation Building West Block
PO Box 8700
St. John's NL Canada A1B 4J6
T (709) 729-2563
F (709) 729-0320
E hkhan@gov.nl.ca
www.mae.gov.nl.ca/waterres/

From: Hanchar, Dorothea
Sent: Tuesday, July 17, 2018 10:00 AM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>; Squires, Susan <SusanSquires@gov.nl.ca>
Cc: Khan, Haseen <hkhan@gov.nl.ca>
Subject: EIS Review_DWH.docx

Please find my comments attached.

Thank you for your patience.

Dorothea

s.13(1)(c)

From: Gilliard, Carol-Ann
Sent: Wednesday, July 18, 2018 5:32 PM
To: Sweeney, Joanne
Subject: Re: Preparation for Grieg EIS review

Categories: Purple Category

Hi Joanne,

Carol-Ann

s.13(1)(c)

Sent from my iPhone

On Jul 18, 2018, at 4:41 PM, Sweeney, Joanne <joannesweeney@gov.nl.ca> wrote:

Thank you for your comments Carol-Ann.

In reference to the first sentence in paragraph two in your email below: Would you provide direction to the EA Committee as to whether/ how the project should proceed, strictly from a Tourism perspective? The options for recommendation are as follows:

- a) The project may be released;
- b) The project may proceed with conditions (state conditions from Tourism); or
- c) The project should not proceed (state reasons)

Your direction in this regard will assist the EAC in formulating a recommendation to the MAE minister.

Regards,

Joanne

Joanne Sweeney

Environmental Assessment Division
Department of Municipal Affairs and Environment
PO Box 8700, St. John's NL A1B 4J6
Tel. (709) 729-2822

From: Gilliard, Carol-Ann
Sent: Wednesday, July 18, 2018 1:39 PM
To: Squires, Susan <SusanSquires@gov.nl.ca>; Angelopoulos, John <johnangelopoulos@gov.nl.ca>
Cc: Sweeney, Joanne <joannesweeney@gov.nl.ca>; Skinner, Gillian <GSkinner@gov.nl.ca>; Murphy, Carmela <carmelamurphy@gov.nl.ca>
Subject: RE: Preparation for Grieg EIS review

Hi Susan,

The Tourism and Culture Branch of TCII has reviewed the EIS submitted by Grieg Newfoundland and Labrador.

The EIS responds to the concerns identified by tourism stakeholders, primarily in the outfitting sector, about the potential risks associated with escapes, recapture plans, sea lice control, introducing a new strain of salmon and potential impacts on wild Atlantic salmon. While the EIS submitted by Grieg Newfoundland and Labrador outlined extensive detail about its risk management plans and mitigations and the company has responded to the concerns identified by stakeholders, TCII does not have the scientific or subject matter expertise to recommend whether or not the mitigations outlined will sufficiently address these concerns.

Carol-Ann

Carol-Ann Gilliard

Director, Sector Diversification
Department of Tourism, Culture, Industry and Innovation
2nd floor West Block, Confederation Building
P.O. Box 8700
St. John's, NL, A1B 4J6
e: carolanngilliard@gov.nl.ca
(709) 729-1708

From: Squires, Susan
Sent: Monday, July 16, 2018 4:14 PM
To: Angelopoulos, John; Gilliard, Carol-Ann
Cc: Sweeney, Joanne
Subject: RE: Preparation for Grieg EIS review

John & Carol-Ann,

When does TCII anticipate being able to submit their comments on the Greig EIS? The agency comments were due on July 13, 2018.

Kind regards,
Susan

Susan Squires, Ph.D.
Director
Environmental Assessment Division
Department of Municipal Affairs and Environment
Government of Newfoundland and Labrador
709-729-0673
susansquires@gov.nl.ca

From: Sweeney, Joanne
Sent: Tuesday, May 22, 2018 3:49 PM
To: Hanchar, Dorothea <DorotheaHanchar@gov.nl.ca>; Ficzero, Vicki <vickificzero@gov.nl.ca>; Angelopoulos, John <johnangelopoulos@gov.nl.ca>; Hendry, Christopher (Christopher.Hendry@dfo-mpo.gc.ca) <Christopher.Hendry@dfo-mpo.gc.ca>; carole.grant@dfo-mpo.gc.ca <carole.grant@dfo-mpo.gc.ca>; Adams, Blair <BlairAdams@gov.nl.ca>; kawaja, jonathan <jonathankawaja@gov.nl.ca>; Whelan, Dr. Daryl S <DarylSWhelan@gov.nl.ca>; Ginn, Melissa (Melissa.Ginn@tc.gc.ca) <Melissa.Ginn@tc.gc.ca>; Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA) <Jerry.Pulchan@EC.GC.CA>; Denning, Allison (HC/SC) (allison.denning@canada.ca) <allison.denning@canada.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>

Subject: RE: Preparation for Grieg EIS review

Hi All,

The Grieg EIS has been posted on the MAE web page at the link below:
http://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/index.html .

I'll deliver the paper copy and USB drives to the St. John's EAC folks tomorrow morning, if you can arrange to meet me at your building entrance. I plan to leave the Confederation Bldg at 9:30am and will head to DFO, TC, and FLR (Jerry is picking his up). Paper and electronic copies will be sent to Allison, Blair and Jonathan tomorrow via Sameday Courier. I'll forward the tracking number.

- The 50-day public review period begins tomorrow and ends on Wednesday, July 11, 2018.
- To better align the EAC recommendation with the public review period, I ask that you provide your EIS recommendation to me by July 13, 2018.
- The minister's decision regarding the acceptability of the EIS is due by July 31, 2018.
- The minister's recommendation to Cabinet is due by August 30, 2018
- Cabinet will inform the proponent of its decision.

I suggest we start reviewing the document before meeting to discuss, so I'm proposing we meet during the week of June 18 to discuss progress/concerns with the review. By that time we may have public comments to consider. If you'd like to meet sooner or if you have any questions, please let me know.

Regards,

Joanne

Joanne Sweeney

Environmental Assessment Division
Department of Municipal Affairs and Environment
PO Box 8700, St. John's NL A1B 4J6
Tel. (709) 729-2822



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Environmental Stewardship Branch
6 Bruce Street
Mount Pearl, NL A1N 4T3

11 July 2018

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Department of Municipal Affairs and Environment
PO Box 8700, St. John's NL A1B 4J6

Dear Ms. Sweeney:

**RE: Environmental Impact Statement of the Placentia Bay EAS# 2016-011
Aquaculture Project**

Environment and Climate Change Canada (ECCC) has reviewed the environmental impact statement for the Placentia Bay Atlantic Salmon Aquaculture project and offers the general comments, followed by specific comments.

General Comments

ECCC-01 Canadian Environmental Protection Act

Grieg NL should be aware of the potential applicability of the *Canadian Environmental Protection Act* (CEPA, 1999) (<http://laws-lois.justice.gc.ca/eng/acts/C-15.31/index.html>). The *Canadian Environmental Protection Act* enables protection of the environment, and human life and health, through the establishment of environmental quality objectives, guidelines and codes of practice and the regulation of toxic substances, nutrients, emissions and discharges from federal facilities, and disposal at sea.

Controlling Toxic Substances

Under CEPA - Part 5, a substance is considered toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that have or may have an immediate or long-term harmful effect on the environment or its biological diversity, constitute or may constitute a danger to the environment on which life depends, and constitute or may constitute a danger in Canada to human life or health.

While there are currently no sector specific CEPA, 1999 regulations to manage toxic substances from marine finfish aquaculture, EC and Health Canada are currently implementing the **Chemicals Management Plan** which will evaluate chemicals currently in commerce according to their level of risk. Control strategies may be implemented for substances which present the highest levels of risk.

Further information on the Chemicals Management Plan can be found at:
<http://www.chemicalsubstanceschimiques.gc.ca/plan/index-eng.php>.

Disposal at Sea

Federal legislation governing the disposal of substances at sea is found in the CEPA Part 7, Division 3, and Schedules 5 and 6. The definition of disposal is provided in CEPA sub-section 122 (1). In Canada most disposal at sea activities involve dredged material; however, two primary examples of marine finfish aquaculture activities that are likely to be defined as Disposal at Sea include the disposal of aquaculture wastes at sea from a ship and the disposal or abandonment at sea of a platform or another structure. Disposal at Sea permits are available only for a limited categories of wastes and only if disposal at sea is demonstrated to be the preferred waste management option. For further information refer to <https://www.ec.gc.ca/iem-das/Default.asp?lang=En&n=0047B595-1>.

Provisions for Management of Hazardous Waste

ECCC is responsible for administering the *Interprovincial Movement of Hazardous Waste Regulations* (IMHWR) under the CEPA. These regulations set out the conditions which must be met in order to monitor and track the transboundary movement of hazardous wastes in Canada to ensure that they are recycled or disposed of in an environmentally sound manner. Proponents should be aware that under the IMHWR, all hazardous wastes must be identified, appropriately packaged and transported by an authorized carrier within Canada. In addition, all hazardous wastes must be accompanied by a manifest or movement document. The IMHWR and related information on these regulations is available at <http://ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=68>.

New Substances Notification Regulations

Project management should take into account the potential applicability of the New Substances Notifications Regulations (NSNR) of CEPA, 1999. The NSNR apply to new substances manufactured in or imported into Canada. A new substance is any substance that is not listed on the Domestic Substances List (DSL).

Any person who intends to import or manufacture a new substance in Canada must submit a notification to the New Substances Program **prior** to importing or manufacturing the substance. The NSNR apply to chemicals, polymers, biochemicals, biopolymers and animate products of biotechnology. Products of biotechnology include micro-organisms, such as bacteria and fungi, and organisms other than micro-organisms, such as genetically-modified fish and livestock. The NSNR specify the requirements for the notification of new substances. They prescribe the information that must be submitted, when it must be submitted and the time in which the government must complete the risk assessment.

Based on the information provided, EC is unable to determine whether the proponent will be subject to the NSNR. For more information, please visit the NSN website (<http://www.ec.gc.ca/subsnouvelles-newsups/default.asp>).

National Pollutant Release Inventory Reporting

The National Pollutant Release Inventory (NPRI) is a federally administered program that collects data on annual on-site emissions of substances to the air, water, and land, as well as off-site transfers of substance disposal or recycling. Facilities that meet certain reporting criteria for any of the listed substances are required to report information to EC through the NPRI. Reporting to the NPRI is a legal requirement and mandatory under Canadian Law; the legal authority for the NPRI is the *Canadian Environmental Protection Act*, subsection 46(1).

Generally, facilities must review their activities and determine if they are subject to reporting. Further details on NPRI reporting requirements may be found by contacting the NPRI office at 1-877-877-8375 or inrp-npri@ec.gc.ca.

ECCC-02 Construction

At the project planning stage, all available construction materials should be considered (e.g., untreated wood, treated wood, pre-cast concrete, corrosive-resistant steel, plastic lumber), and those materials best suited to the conditions and intended use of the structure should be selected. Analysis of the preferred construction material should include a consideration of the full life-cycle of the material (ease of use, design factors associated with the construction material, maintenance requirements, and final disposal). Environmental implications (e.g. storm and ice damage) associated with each life-cycle phase should also be considered.

Concrete Production

Discharges from project work involving the use of concrete, cement, mortars and other Portland cement or lime-containing construction materials may have a high pH, and work should be planned and conducted to ensure that sediments, debris, concrete, and concrete fines are not deposited, either directly or indirectly into the aquatic environment. Any potentially contaminated water (e.g. exposed aggregate wash-off, wet curing, equipment and truck washing), should be prevented from entering the aquatic environment unless it can be confirmed that this water will not be deleterious to fish or harmful to migratory birds. Containment facilities should be provided at the site as required.

ECCC-03 On-land Disposal and Site Disturbance

In general, impacts related to onshore disturbance should be designed so as to:

- place a priority on pollution prevention;
- facilitate compliance with the general prohibition against the deposit of a deleterious substance into waters frequented by fish (Section 36 of the *Fisheries Act*); and
- respect applicable Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines.

In terms of site disturbance the following 'best practices' should be reflected in efforts to manage impacts so as to respect the above-noted objectives:

- install siltation control structures (e.g. silt curtains, cofferdams, sediment fences) prior to beginning any activities involving disturbance of the site and work along the shoreline if appropriate;
- schedule work to avoid periods of heavy precipitation;
- maintain a vegetated buffer zone, as appropriate and where possible, to protect surface waters;
- immediately stabilize any disturbed areas along the shoreline to prevent erosion;
- monitor the integrity and effectiveness of the siltation control structures daily for the duration of the project; and
- upon completion of the project, only remove silt control structures when suspended sediment concentrations within any contained water have returned to background conditions.

ECCC-04 Suspension of Sediments

The disturbance of substrate during in-water activities increases sediment concentrations and turbidity in the water column. This disturbance may alter light penetration, temperature and water chemistry regimes, and may affect photosynthesis. The CCME (Canadian Council of Ministers of the Environment) *Canadian Environmental Quality Guidelines* (1999) recommend that, for protection of marine waters, human activities should not cause suspended solids levels to increase by more than 10% of the natural conditions expected at the time. The guidelines also recommend that no solid debris, including floating or drifting materials or settleable matter, be introduced into marine and estuarine waters.

ECCC-05 Accidents and Malfunctions

Provisions for the management of hazardous materials (e.g. fuels, lubricants) and wastes (e.g. contaminated soil, sediments, waste oil) should be identified and implemented in order to ensure compliance with Section 36 (3) of the *Fisheries Act*, and with CEPA and the *Migratory Birds Convention Act* and their Regulations. The following mitigation recommendations are made with respect to the transport, storage, use and disposal of petroleum products and toxic substances which, when employed, may minimize the risk of chronic and accidental releases and impacts to the environment:

- Even small spills of oil can have very serious effects on migratory birds and fish. Therefore, every effort should be taken to ensure that no oil spills occur in the area.
- Fuelling and maintenance of equipment should be undertaken on level terrain, at least **30m** from any surface water (including wetlands), on a prepared impermeable surface with a collection system to ensure oil, gasoline and hydraulic fluids do not enter surface waters. Waste oil should be disposed of in an approved manner.
- Biodegradable alternatives to petroleum-based fluid for heavy machinery are commonly available from major manufacturers. Such biodegradable fluids should be considered for use in place of petroleum products whenever possible, as a standard for best practices.
- Drums of petroleum products or chemicals should be tightly sealed against corrosion and rust and surrounded by an impermeable barrier in a dry, water-tight building or shed with an impermeable floor.
- In order to ensure that a quick and effective response to a spill event is possible, spill response equipment should be readily available on-site. Response equipment, such as adsorbents and open-ended barrels for collection of cleanup debris, should be stored in an accessible location on-site. Personnel working on the project should be knowledgeable about response procedures. The proponent is encouraged to prepare contingency plans that reflect a consideration of potential accidents and malfunctions and that take into account site-specific conditions and sensitivities. The Canadian Standards Association publication, *Emergency Preparedness and Response*, CAN/CSA-Z731-03¹, is a useful reference.
- All spills or leaks, such as those from machinery or storage tanks, should be promptly contained and cleaned-up. The proponent should report any spills of petroleum or other hazardous materials to the Environmental Emergencies 24 Hour Report Line (1-800-563-9089).

¹ Canadian Standards Association publication, *Emergency Preparedness and Response*, CAN/CSA-Z731-03 (<http://shop.csa.ca/en/canada/injury-prevention/canrsa-z731-03-r2009/inv/27019912003>)

ECCC-06 Effects of the Environment on the Project

It is recommended that the proponent consider the 'Effects of the Environment on the Project' since coastal infrastructure is sensitive to the impacts of wind, waves, storm surges and sea ice. Climatological data required to support the EA can be found at <http://www.climate.weatheroffice.ec.gc.ca/>, and value-added data can be obtained from EC's Climate Services where the data exist. The project should be engineered to withstand extreme local weather conditions so as to minimize the risk of environmental emergencies.

ECCC-07 Impact of Climate Change on the Project

Climate change-induced sea level rise will affect the project area. Over the next century, global average sea level rise projections range from 18 to 59 cm (IPCC, 2007). Crustal subsidence is also occurring over southern portions of the Atlantic Region. Coastal erosion will add to sea level rise effects as well. Sea level rise and crustal subsidence will exacerbate the effects of winds, waves and storm surges.

In considering the full life-cycle of the project, any vulnerability of the project to climate change should be identified and adjustments made if necessary. It may be more cost-effective to adjust design criteria at the planning stage than to retrofit in future.

ECCC-08 Monitoring and Adaptive Management

The proponent is encouraged to prepare a water quality monitoring program (including location and number of sampling sites, sampling protocols (parameters, sampling frequency) that allows for timely detection of water quality changes) and identifies action thresholds for implementation of appropriate adaptive management measures. Such a program should take into account existing and appropriate regulations, or Section 36 (3) of the *Fisheries Act*, the Canadian Council of Ministers of the Environment publication, *Environmental Quality Guidelines for the protection of aquatic life* (http://www.ccme.ca/publications/cegg_rcqe.html) in conjunction with existing ambient water quality and site-specific factors.

ECCC-CWS-01 Migratory Birds

Migratory birds, their eggs, nests, and young are protected under the *Migratory Birds Convention Act* (MBCA). Migratory birds protected by the MBCA generally include all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds, and most landbirds (birds with principally terrestrial life cycles). The list of species protected by the MBCA can be found at: <https://www.ec.gc.ca/nature/default.asp?lang=En&n=496E2702-1>. Bird species not listed may be protected under other legislation.

Under Section 6 of the *Migratory Birds Regulations* (MBR), it is forbidden to disturb, destroy, or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities.

Furthermore, Section 5.1 of the MBCA describes prohibitions related to deposit of substances harmful to migratory birds:

"5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

- (2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance — in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area — that is harmful to migratory birds.”

It is the responsibility of the proponent to ensure that activities are managed so as to ensure compliance with the MBCA and associated regulations.

ECCC-CWS-02 Vegetation Clearing

Clearing vegetation may cause disturbance to migratory birds, and may inadvertently cause the destruction of their nests and eggs. Many species use trees, as well as brush, deadfalls and other low-lying vegetation for nesting, feeding, shelter and cover. This would apply to songbirds throughout the region, as well as waterfowl in wetland areas. Disturbance of this nature would be most critical during the migratory bird nesting period. Please see the webpage “General Nesting Periods of Migratory Birds in Canada” (Website: <http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1>) for more specific information concerning the breeding times of migratory birds in the proponent’s local area. This project area falls within zone “D3-4”.

Environment and Climate Change Canada provides the following recommendations:

1. The proponent is recommended to avoiding certain activities, such as clearing, during the regional nesting period for migratory birds. The breeding season for most birds within the project area occurs between April 15th and August 15st in this region (see above website for more specific time periods by zone).
2. Active nests can be discovered during project activities outside of the regional nesting period. To reduce the risk of impacting nests or birds caring for pre-fledged chicks at those times, Environment and Climate Change Canada-Canadian Wildlife Service (ECCC-CWS) recommends implementation of measures such as the establishment of vegetated buffer zones around nests, and minimization of activities in the immediate area until nesting is complete and chicks have naturally migrated from the area. It is incumbent on the proponent to identify the best approach, based on the circumstances, to complying with the MBCA
3. The proponent should be cognizant that while most migratory bird species construct nests in trees (sometimes in tree cavities) and shrubs, mitigations should be appropriate for migratory birds with different breeding strategies. For example, several species nest at ground level (e.g., Common Nighthawk, Killdeer, sandpipers), in hay fields, pastures or in burrows. Some bird species may nest on cliffs or in stockpiles of overburden material from mines or the banks of quarries. Some migratory birds (including certain waterfowl species) may nest in head ponds created by beaver dams. Some migratory birds (e.g., Barn Swallow, Cliff Swallow, Eastern Phoebe) may build their nests on structures such as bridges, ledges or gutters.
4. The proponent is recommended to develop and implement a management plan that includes appropriate preventive measures to minimize the risk of impacts on migratory birds (See “Planning ahead to reduce risks to migratory bird nests”, PDF: http://publications.gc.ca/collections/collection_2011/ec/CW66-295-2011-eng.pdf). It is the responsibility of the individual or company undertaking the activities to determine these measures. For beneficial management practices regarding how to avoid the incidental take of migratory birds nests and eggs, please refer to the Avoidance Guidelines

(Website: <http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=AB36A082-1>). The management plan should include processes to follow should an active nest be found at any time of the year.

ECCC-CWS-03 Fuel Leaks

The proponent must ensure that all precautions are taken by the contractors to prevent fuel leaks from equipment, and that a contingency plan in case of oil spills is prepared. Furthermore, the proponent should ensure that contractors are aware that under the MBR, “no person shall deposit or permit to be deposited oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.” Biodegradable alternatives to petroleum-based chainsaw bar oil and hydraulic fluid for heavy machinery are commonly available from major manufacturers. Such biodegradable fluids should be considered for use in place of petroleum products whenever possible, as a standard for best practices. Fueling and servicing of equipment should not take place within 30 meters of environmentally sensitive areas, including shorelines and wetlands.

Provisions for wildlife response activities should be identified in the Oil Spill Prevention and Response Plan to ensure that pollution incidents affecting Wildlife are effectively and consistently mitigated. The document “Birds and Oil - CWS Response Plan Guidance” is attached and is provided to offer guidance on the development of wildlife response activities.

The following information should be included in any Oil Spill Prevention and Response Plan:

- Mitigation measures to deter migratory birds from coming into contact with the oil.
- Mitigation measures to be undertaken if migratory birds and/or sensitive habitat become contaminated with the oil.
- The type and extent of monitoring that would be conducted in relation to various spill events.

ECCC-CWS-04 Stockpiles

Certain species of migratory birds (e.g. Bank Swallows) may nest in large piles of soil left unattended/unvegetated during the most critical period of breeding season (April 15th through August 15th). To discourage this, the proponent should consider measures to cover or to deter birds from these large piles of unattended soil during the breeding season. If migratory birds take up occupancy of these piles, any industrial activities (including hydroseeding) will cause disturbance to these migratory birds and inadvertently cause the destruction of nests and eggs. Alternate measures will then need to be taken to reduce potential for erosion, and to ensure that nests are protected until chicks have fledged and left the area. For a species such as the Bank Swallow, the period when the nests would be considered active would include not only the time when birds are incubating eggs or taking care of flightless chicks, but also a period of time after chicks have learned to fly, because Bank Swallows return to their colony to roost.

See also for example the attached guidance concerning beneficial management practices that should be considered for implementation when designing mitigation measures for Bank Swallows, as well as guidance provided at <https://www.canada.ca/en/environment-climate-change/services/migratory-bird-conservation/publications/bank-swallow-riparia-sandpits-quarries.html>

ECCC-CWS-05 Revegetation

A variety of species of plants native to the general project area be used in revegetation efforts. Should seed mixes for herbaceous native species for the area not be available, it should be ensured that plants used in revegetation efforts are not known to be invasive.

ECCC-CWS-06 Invasive Species

Measures to diminish the risk of introducing invasive species should be developed and implemented during all project phases. These measures could include:

- Cleaning and inspecting construction equipment prior to transport from elsewhere to ensure that no vegetative matter is attached to the machinery (e.g., use of pressure water hose to clean vehicles prior to transport)
- Regularly inspecting equipment prior to, during and immediately following construction in areas found to support Purple Loosestrife to ensure that vegetative matter is not transported from one construction area to another.

ECCC-CWS-07 Light Attraction and Migratory Birds

Attraction to lights at night or in poor visibility conditions during the day may result in collision with lit structures or their support structures, or with other migratory birds. Disoriented migratory birds are prone to circling light sources and may deplete their energy reserves and either die of exhaustion or be forced to land where they are at risk of depredation.

To reduce risk of incidental take of migratory birds related to human-induced light, ECCC-CWS recommends implementation of the following beneficial management practices:

- The minimum amount of pilot warning and obstruction avoidance lighting should be used on tall structures. Warning lights should flash, and should completely turn off between flashes.
- The fewest number of site-illuminating lights possible should be used in the project area. Only strobe lights should be used at night, at the lowest intensity and smallest number of flashes per minute allowable by Transport Canada.
- Lighting for the safety of the employees should be shielded to shine down and only to where it is needed.
- LED lights should be used instead of other types of lights where possible. LED light fixtures are less prone to light trespass (i.e. are better at directing light where it needs to be, and do not bleed light into the surrounding area), and this property reduces the incidence of migratory bird attraction.

ECCC-CWS-08 Coastal Infrastructure

ECCC-CWS advises the following recommended beneficial management practices for working on shorelines:

- Staff, contractors and visitors should not approach concentrations of seabirds, sea ducks or shorebirds.
- All vessels should use the main navigation channels to get to and from the site, and should have well muffled machinery.
- Staff and contractors should undertake any measures that may minimize or eliminate discharge of oily waste into the marine environment.
- Food scraps and other garbage left on beaches and other coastal habitats can artificially enhance the populations of avian and mammalian predators of eggs and chicks. The

proponent should ensure that no litter (including food waste) is left in coastal areas by their staff and/or contractors

- If there is any noticeable change in seabird numbers or distribution at the location during operations, ECCC-CWS should be notified.

ECCC-CWS-09 Species at Risk

The following avian species at risk (as listed on Schedule 1 of the *Species at Risk Act*) may occur within the study area: Olive-sided flycatcher (Threatened), Harlequin Duck (Special Concern; known to winter in the area), and Red Crossbill (*Percna* subspecies, Endangered). Though unlikely to be found within the project footprint, these species may occur within the study area and we request that sightings be reported to ECCC-CWS.

ECCC-CWS-10 Wetlands

It should be clarified whether any coastal wetlands, including eelgrass beds, would be affected by the project.

The *Federal Policy on Wetland Conservation* (FPWC) is applicable to any Federal Departments exercising a power, duty, or function that would permit the carrying out of the project or associated activities. The policy recognizes the importance of wetlands to the environment, the economy and human health, and promotes a goal of no-net-loss of wetland functions. In support of this goal, the FPWC and related implementation guidance identify the importance of planning, siting and designing a project in a manner that accommodates a consideration of mitigation options in a hierarchical sequence - avoidance, minimization, and as a last resort, compensation.

For those potentially affected wetlands where the FPWC would be applicable, and avoidance is deemed not possible, a detailed description of potential effects, and of the reasons why avoidance and minimization of impacts were determined to not be possible should be provided. The mitigation measures and monitoring plan, as well as a proposed compensation plan, should be consistent with those proposed for other projects in Atlantic Canada.

A copy of the FPWC can be found at: <http://publications.gc.ca/pub?id=9.686114&sl=0>.

Specific Comments

ECCC-11 Incomplete Appendix

Sections 3, 4 and 5 of Appendix K (Grieg NL Fish Health Management Plan) are not included in the document because *Grieg NL is currently developing procedures and protocols...and the proprietary nature of the Standard operating Procedures*. Hence, ECCC cannot provide comments on chemicals that will be used.

Grieg NL proponent should determine the potential applicability of the *Canadian Environmental Protection Act 1999* (CEPA) with regard to the chemicals it plans to use in their aquaculture operations.

ECCC-12 ECCC's Proposed Environmental Emergency Regulations

The *Environmental Emergency Regulations* (E2 Regulations) under Section 200 of the CEPA 1999 apply to any person in Canada who owns, or has charge, management or control of, a

substance listed on Schedule 1 of the regulations where either the total amount of the substance or the single largest container on site is equal to or greater than that specified in the Schedule. It should be noted that substances such as propane, gasoline and ammonia are listed in Schedule 1 of the regulations. It is the responsibility of Grieg NL to determine the applicability of the E2 Regulations.

It is stated in section 3.4.2 of Appendix M (Grieg NL Spill Management Plan, Land and Water) that *two 90,000 L fuel tanks (diesel) are proposed for the RAS Hatchery*. The proponent should note that on October 8, 2016, pursuant to subsection 332(1) of CEPA 1999, the Minister of ECCC published in the *Canada Gazette*, Part I, the proposed *Environmental Emergency Regulations, 2016* (<http://www.gazette.gc.ca/rp-pr/p1/2016/2016-10-08/html/req2-eng.php>).

The proposed Regulations will repeal and replace the current *Environmental Emergency Regulations* (<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-307/index.html>) and will addition of 48 substances (including diesel).

ECCC-CWS-11 Section 2.5.1.1 RAS Hatchery – Construction - Breeding Bird Surveys

Quote: “As required under provincial and federal regulations, breeding bird surveys were conducted in early-July 2017 in advance of grubbing activities. Two experienced bird biologists systematically walked through the survey sites searching for birds and looking for evidence of nesting (see Appendix U). There was only one occasion that required mitigation action. Savannah Sparrows (*Passerculus sandwichensis*) had nested in an area not yet cleared as evidenced by the presence of a fledgling. The surrounding area had been deforested in the previous year (after the bird breeding season). The biologists determined that the fledgling Savannah Sparrow(s) required more time to reach an adequate size to fly away and cross the previously cleared area to reach suitable habitat before construction in the area commenced.”

Migratory bird nests can be found in a wide variety of habitats and locations. Depending on the species, nests may be found at many heights in trees, in tree cavities, in shrubs, on the ground (including in hayfields, crops and pastures), on cliffs, in burrows, in stockpiles of overburden from mines, in quarry banks, within wetlands, and on human-made structures such as bridges, ledges, and gutters.

It is difficult to locate most nests. Nest sites are often hidden and adult birds avoid approaching their nests in a manner that would attract predators to their eggs or young. Moreover, the amount and complexity of habitat to be searched often limits the success of surveys intended to locate all active nests. The nests of a few species are easier to locate, particularly those in isolated trees, on human-made structures and/or in colonies.

To determine the likelihood that migratory birds, their nests or eggs are present in a particular location, use a scientifically sound approach that considers the available bird habitats, which migratory bird species are likely to be encountered in such habitats, and the time periods when they would likely be present. This will help you plan work activities to avoid having an impact on nesting birds. If further investigation is required to determine the presence of breeding birds, consider conducting an area search for evidence of nesting (e.g., presence of birds in breeding habitat through observation of singing birds, alarm calls, distraction displays) using non-intrusive search methods to prevent disturbance to migratory birds. In the case of songbirds, for example, “point counts” (a technique to locate singing territorial males) may provide a good indication of the presence of nests of these birds in an area. Please contact Environment and Climate Change Canada’s Canadian Wildlife Service office in your region for further technical

information about investigation methods for non-song bird species (notably, waterfowl, waterbirds and shorebirds).

In most cases, nest search techniques are not recommended because, in most habitats, the ability to detect nests remains very low while the risk of disturbing active nests is high. Flushing nesting birds increases the risk of predation of the eggs or young, or may cause the adults to abandon the nest or the eggs. Therefore, except when the nests searched are known to be easy to locate without disturbing them, active nest searches are generally not recommended; they have a low probability of locating all nests, and are likely to cause disturbance to nesting birds. In many circumstances, incidental take is likely to still occur during industrial or other activities even when active nest searches are conducted prior to these activities.

In some cases, nest surveys may be carried out successfully by skilled and experienced observers using appropriate methodology, and in the event that activities would take place in simple habitats (often in man-made settings) with only a few likely nesting spots or a small community of migratory birds. Examples of simple habitats include:

- an urban park consisting mostly of lawns with a few isolated trees;
- a vacant lot with few possible nest sites;
- a previously cleared area where there is a lag between clearing and construction activities (and where ground nesters may have been attracted to nest in cleared areas or in stockpiles of soil, for instance); or
- a structure such as a bridge, a beacon, a tower or a building (often chosen as a nesting spot by robins, swallows, phoebes, Common Nighthawks, gulls and others).

Nest searches can also be considered when looking for:

- conspicuous nest structures (such as nests of Great Blue Herons, Bank Swallows, Chimney Swifts);
- cavity nesters in snags (such as woodpeckers, goldeneyes, nuthatches); or
- colonial-breeding species that can often be located from a distance (such as a colony of terns or gulls).

ECCC-CWS-12 Section 2.5.1.1 RAS Hatchery – Construction - Breeding Bird Surveys

Quote: "The area where the fledgling was observed was marked with a flag and the site was not cleared until two weeks later."

The nest itself should never be marked using flagging tape or other similar material as this increases the risk of nest predation. If necessary, flagging tape should be placed at the limits of the buffer zone.

ECCC-CWS-13 Section 2.5.1.1 RAS Hatchery – Construction - Breeding Bird Surveys

Quote: "If future site clearance activities are required during the breeding bird period, the area will be monitored for nesting activity and appropriate mitigation actions will be taken. Areas will be visually inspected by construction personnel. If any evidence of nesting is detected, then a bird biologist will be consulted and delay of clearing activities will occur."

Appropriate mitigation actions should be detailed in this section. Areas should be assessed by qualified bird biologists rather than by construction personnel.

ECCC-CWS-14 Section 2.5.2.2 Operations and maintenance - Predator protection and control

Quote: "Each sea cage will have bird nets which cover the entire top of the cage and prevent birds from taking fish. The bird net and bird poles are part of the Aqualine Midgard sea cage system and are designed to provide sufficient tension to eliminate net sagging. The sides of the bird net can be raised and lowered like a window blind to quickly and easily access the cage. Bird nets will be deployed ensuring mesh size will be sufficient to deter predators but minimize the risk of entanglement. If a bird does become entangled Grieg NL will follow established procedures to release the bird (which will be developed in consultation with ECCC-CWS). Grieg NL will have a Migratory Bird Handling Permit (issued by CWS) in place and will follow reporting requirements."

It should be ensured that bird release procedures have been established prior to project implementation. It should be ensured that all MBCA permits are in place prior to implementation.

ECCC-CWS-15 Section 4.8.3 Sensitive Areas VEC

Quote: "Population and/or breeding pair estimates for several seabird species within IBAs in the Study Area are similarly outdated, with some estimates dating to the late-1980s (e.g., breeding pairs of Black-legged Kittiwake at the Cape St. Mary's IBA; and Leach's Storm-petrel, and Black Guillemot at the Middle Lawn Island IBA)."

The ECCC-CWS population assessments of the above-mentioned colonies are either recently finished or are currently underway.

ECCC-CWS-16 Section 7.3.2.1 Entanglement

Quote: "Grieg NL will have mitigation measures in place to minimize entanglement effects on bird SAR. Each sea cage will have bird nets which cover the entire top of the cage and prevent birds from entering the sea cage. The bird net and bird poles are part of the Aqualine Midgard sea cage system and are designed to provide sufficient tension to eliminate net sagging. Bird nets will be deployed ensuring mesh size will be sufficient to deter predators but minimize the risk of entanglement. The mesh will be dark in colour to make it visible to birds. If a bird does become entangled, Grieg NL will follow established procedures to release the bird (which will be developed in consultation with ECCC-CWS). Grieg NL will have a Migratory Bird Handling Permit issued by CWS in place and will follow reporting requirements. In addition, sea cages will be routinely cleaned (at least weekly), minimizing the build-up of fouling organisms that may attract diving birds."

It should be ensured that bird release procedures have been established prior to project implementation. It should be ensured that all MBCA permits are in place prior to implementation.

ECCC-CWS-17 Section 7.3.2.2 Attraction to Lights

Quote: "Installation and removal of the mooring system and sea cages will occur during daylight hours and as such, lighting is not expected to affect birds during construction and decommissioning activities. During operation of the sea cage sites, there will be lighting on the feed/accommodation and satellite barges as well as lights marking the mooring system boundary. Grieg NL will minimize the amount of lighting to that needed for safe operations. In addition, downward-pointing and shaded lights on the barges will be used to the extent possible. Weather permitting, the barges will be searched for stranded birds daily and any stranded birds will be handled, released, and documented according to ECCC-CWS protocols. In addition, any catchment basins on the barges will be covered to prevent birds from entering."

The proponent should be prepared to conduct systematic checks for stranded birds, rather than only conducting routine checks, whereby designated crew members record search effort (even when no birds are found). Should storm-petrels or other species become stranded on vessels or on land, the proponent is expected to adhere to the attached *Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada* (2017), which provides safe and effective procedures for dealing with and documenting live and stranded birds. A permit is required to implement this protocol. The proponent should be advised that it is required to complete a permit application form prior to proposed activities. Permit application forms can be obtained by contacting ECCC's Canadian Wildlife Service (CWS) via email at ec.scfatlpermis-cwsatlpermits.ec@canada.ca.

The proponent should also be advised that any storm-petrels that are found dead should be collected and sent to ECCC-CWS. ECCC-CWS should be contacted within 24 hours in the event of mortality of an individual migratory bird species at risk or 10 or more migratory birds in one event or night.

Please don't hesitate to contact me should you have any questions regarding our comments.

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Health Canada Santé
Canada Canada

Environmental Health Program
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Halifax, NS B3J 3Y6

July 13, 2018

Joanne Sweeney
Environmental Assessment
Department of Environment and Conservation
P.O. Box 8700
St. John's, NL
A1B 4J6

Subject: Health Canada's Response - LGL Limited Environmental Impact Statement of the
Placentia Bay Atlantic Salmon Aquaculture Project¹

Dear Ms. Sweeney:

Health Canada, as an appointed member of the provincial Environmental Assessment Committee, has prepared the following comments related to the above-mentioned proposed aquaculture project in Marystown and Placentia Bay, NL. The comments are focused on areas within Health Canada's mandate. These include: 1) reviewing information related to pesticides and anti-fouling substances (which are the responsibility of the Pest Management Regulatory Agency of Health Canada (under the *Pest Control Products Act/PCPA*)); 2) drug approval (which is the responsibility of the Veterinary Drugs Directorate of Health Canada (under the *Food and Drugs Act*)); and certain disinfectants which are currently regulated by Health Canada and the Canadian Food Inspection Agency under the *Food and Drugs Act*. In addition, Health Canada, in its review of environmental impact assessments, also evaluates human health with respect to contamination in air, potable and recreational water, country foods, and noise.

Use of Pesticides/Drugs/Disinfectants:

Based on a review of the EIS, it appears that the proposed pesticides, drugs and disinfectants are currently approved by Health Canada for use at marine salmon aquaculture facilities. Provided they are administered by properly trained/licenced professionals, the company should be in compliance with federal regulatory requirements. Prior to administration of any pesticide, drug or disinfectant, the company should confirm that these substances are still approved for the specific use intended. If disposal is required, the company should dispose of any pesticide, drug

¹ LGL Limited Environmental Research Associates. 2018. Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project. Prepared for Greig NL. May.

Sent by e-mail to joanne.sweeney@gov.nl.ca

or disinfectant in a manner such that adverse impacts to human health or the environment are minimized.

In the Table of Contents of Appendix K, Section 4.4 indicates that this appendix will discuss chemicals and disinfectants, however, in reviewing the actual Section 4, it states that the proponent is currently developing procedures and protocols for its sea site operations, and that standard operating procedures (SOPs) will be developed prior to operations commencing. Health Canada would be interested in reviewing these SOPs prior to project commencement to ensure that no unacceptable health risks (either directly or via the consumption of non-target species) may occur as a result of the use and/or disposal of chemicals and disinfectants during operations.

Contamination of Country Foods:

Country foods or 'traditional foods' are defined as all foods that are trapped, fished, hunted, harvested or grown for subsistence or medicinal purposes, outside of the commercial food chain. This project may impact country foods by introducing additional nutrients (e.g. uneaten food, feces) and chemicals (e.g. in-feed drugs) to the larger marine environment. Depending on disposal methods for cleaning solutions and/or disinfectants (used to decontaminate workers and their equipment between sites), these may also be directly discharged to the marine environment (although Appendix K does indicate that at some point in time there will be a procedure developed related to diver disinfection per site and diver disinfection procedures if diving multiple sites). Although the proponent indicates that they will minimize excess waste and reduce, reuse and recycle to the extent possible, it is important to consider that these nutrient-rich environments may attract other non-target organisms which may eventually be harvested and consumed by local people and depending on the substance(s) released and concentration(s), these may have an impact on human health. Section 3.7.2 of the EIS (Classifying Anticipated Environmental Effects) indicates that toxicity effects on human health is a consideration in determining whether a project is likely to have significant adverse environmental effects, however, it is unclear from the documentation provided where this aspect was specifically evaluated.

Noise:

The marine-based component of the project (i.e. net pens) are planned to be situated in multiple areas in Placentia Bay, and may be near residences and/or cottages (where there may be an expectation of peace and quiet). Given that these boats will be idling during visits to the net pens, there may be concerns raised over noise at these human receptor locations. In the event of public complaints, additional mitigation should be considered to reduce noise levels to the extent possible.

If you have any comments/questions, please contact the undersigned at your convenience.

Sincerely,

Sent by e-mail to joanne.sweeney@gov.nl.ca



Allison Denning, M.E.S.
Regional Environmental Assessment Specialist
Health Canada, Atlantic Region
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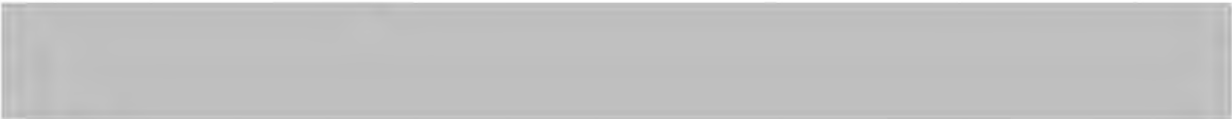

cc: Tom Ferris, Manager, Environmental Health Program, Health Canada, Atlantic Region

**Department of
Fisheries and Land Resources**

**Comments on the Grieg NL Environmental Impact Statement of the Placentia Bay Atlantic
Salmon Aquaculture Project.**

Forestry and Wildlife Branch Comments:

The Forestry and Wild Life Branch (FWB) has found that the Grieg NL Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project is acceptable for release.



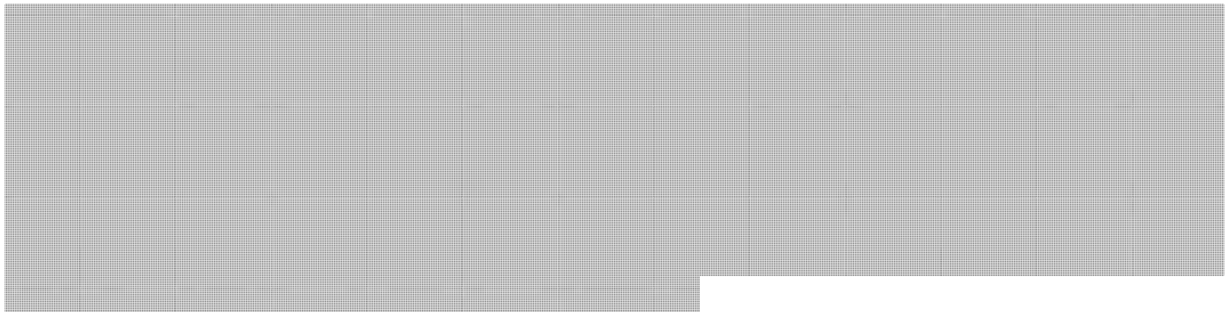
Within the context and scale of the proposed undertaking, this could be considered, if it was not significantly onerous or considered to have a significant impact on project costs however, consideration of requiring the proponent to demonstrate if this requirement would be an onerous and significant cost would be reasonable. There are precedents in both the Maritimes and Newfoundland and Labrador for this type of mitigation around aquaculture and hydroelectric development.

Rationale for recommendation:

Forestry and Wildlife Branch participated in the Environmental Impact Statement Committee and has reviewed the Environmental Impact Statement (EIS) provided by Grieg NL. This review of the EIS was exclusive to potential impacts on inland fish of Newfoundland, the conservation of which falls within the purview of FWB. In particular, this review is primarily focused on the risks to wild Atlantic salmon in southern Newfoundland.

The EIS provides a reasonable overview of the risks to wild Atlantic salmon posed by salmon aquaculture. The literature review is current, if not entirely comprehensive.

There are three key types of risk to wild Atlantic salmon identified; genetic (loss of local adaptation), ecological (exclusion of wild fish from habitat), and disease (e.g. ISA or sea lice). Grieg NL has proposed a series of mitigations to address these three risks; triploid female salmon, a resilient cage system and recapture plan, and biological controls and monitoring respectively. The mitigation planning appears to reduce the risk of these impacts to a relatively low level within the context of the development. However, that risk is clearly *not* zero. It is important to consider the scale of the proposed undertaking relative to the size of wild Atlantic salmon populations in the region. At full production the project will have approximately two million salmon in sea production, and the Placentia Bay area likely has less than 10,000 wild salmon. Escape events or disease outbreaks would be rare, but they may occur. The economic costs of reducing this risk to zero (i.e. land based aquaculture) have been determined to be excessive, making the project non-viable. What options remain to provide insurance against a rare but potentially catastrophic event?



s.13(1)(c)

Fisheries and Aquaculture Branch Comments:

Recommendation:

The Aquaculture Development and Aquatic Animal Health Divisions have reviewed the Grieg NL 'Placentia Bay Salmon Aquaculture Project' Environmental Impact Statement (EIS) against the project's guidelines.

The review focused on the Division's authority, administrative duties and expertise under the *Aquaculture Act* pertaining to: licensing; production planning, strategies and standards; fish health management and oversight. Many good aquaculture production practices, procedures and environmental management and mitigations are integrated. Furthermore, the proponent has submitted a fish health management plan that includes pre-transfer testing, biosecurity and fish health management. **The proponent must identify a fish health team with a company/private aquaculture veterinarian who will oversee all aspects of fish health and welfare.**

It should be noted that although sources of both salmon and lumpfish have been identified, these may change or not be approved due to logistics, fish health testing or production reasons. Transfers of fish will be dealt with on an individual transfer level.

The review concludes that the EIS is acceptable for releasing the undertaking from Environmental Assessment (EA). Of note, FLR and other permitting departments/agencies have conditionally approved the hatchery component of the undertaking pending the outcome of the project's EA. Concerning the marine sites, there is further information under the purview of FLR aquaculture-licensing process that the proponent must submit for review before acquiring aquaculture licences. This information will further specify details related to siting and production. Applications for the first production sites could be seen by the fall 2018 pending the EA outcome.

Release of the project will allow the proponent to begin construction of its hatchery. As well, the EIS identified many supporting supply and service partnerships. Release of the project is an important step in providing the regulatory certainty necessary for the proponent and associated supply and service companies to begin the required investments.

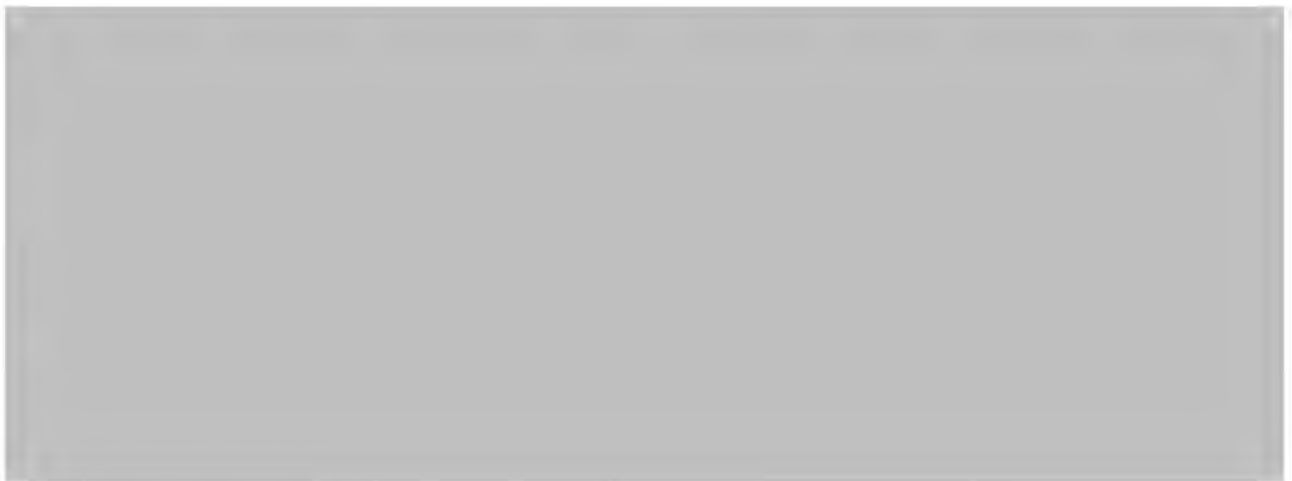
Further to the above comments, a table requested by the EA Division to assist the review of the EIS against the prepared guidelines has been completed for Fisheries and Land Resources's review of the EIS (Refer to Annex A).

Overview:

The following overview provides a more detailed summary of EIS content important to the Division's role and responsibilities. The time between the review of the initial project registration and the preparation of an EIS provided the proponent an opportunity to address the following:

- Clarify construction and operational elements of its plan;

- In a more comprehensive manner, describe the socio-economic and environmental character of the Burin and Placentia Bay region;
- Better describe its approach to emergency preparedness for accidental and environmental issues raised in public consultations;
- Clarify its intended supply and service partners;
- In a comprehensive manner, describe the containment standards and predicted performance of it's the Midgard sea-cage system against provincial standards that are enforced under the authority of the Minister of Fisheries and Land Resources;
- Describe advances in procedures to verify stock will be all female triploids;
- Outline a production strategy that will increase production in a moderate and incremental manner, consistent with the expressed interest and under the authority of the Minister of Fisheries and Land Resources; and
- An analysis of the predicted impacts and certainty of the project on valued environmental components and socio-economic interests.



FLR authority and regulatory controls concerning aquaculture development, licensing and aquatic animal health:

The *Aquaculture Act* provides the Minister of FLR authority over principle controls that ensure sustainable aquaculture development as follows:

s.13(1)(c)

- Issue aquaculture licences with terms and conditions that address socio-economic, fish health, biosecurity and the environment;
- Provide services and oversight related to licence terms and conditions;
- Link compliance with all associated federal and provincial approvals to the issuing and maintenance of an aquaculture licence;
- Ensure aquaculture operations' comply with stock containment standards;
- Permit the transfer of fish, including the type, timing, location, and number;
- Direct mitigation measures during a disease event; and
- Designate aquaculture inspectors.

After considering the EIS as a whole and its predicted outcomes, it is the Aquaculture Development Division's view that the most important consideration for the project is associated with production success of the proposed stock in Placentia Bay.

The undertaking will introduce a new strain of salmon not previously cultured in the province. The strain will be selected for and treated to be all-female triploid, and this will be a first attempt to do this on a commercial scale in the province. The proponent will develop its production in a bay area that has not previously hosted commercial-scale salmon aquaculture production.

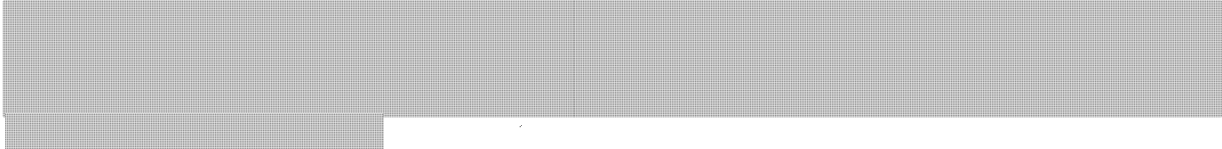
- The EIS provides a description of why the proponent chose the triploid fish, the environmental merits, and how the state-of-knowledge on triploid robustness, matching with water conditions, and feeding has advanced to make it a viable strategy for Placentia Bay.

There is always uncertainty related to aquaculture production in a new location.

- The proponent has completed its due diligence concerning water conditions as well as other environmental conditions (i.e., ice and storms).

The proponent's commitment to use the Aqualine Midgard system represents advancement in design and engineering of contaminant systems for this province.

- The information provided supports our previous advice that the containment system meets or exceeds the regulatory standards prescribed in the 'Code of Containment for the Culture of Salmonids in Newfoundland and Labrador'. The proponent has provided a framework to respond to adverse environmental conditions (including various ice scenarios), and emergencies.



FLR has had extensive discusses with the proponent on this, and the proponent's support for this approach is reflected in the EIS. Upon release of the project from EA, further discussion and specifics of how this is done continues as a core part of aquaculture licensing, as well as performance-based conditions associated with financing if applicable.

s.13(1)(c)

Annex A:
MAE, Environmental Assessment Division, EIS review form
EIS REVIEW

Placentia Bay Atlantic Salmon Aquaculture Project (1834)

*This table was completed by Fisheries and Aquaculture Branch only

EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
2.1 Study Areas		
a.	Acceptable	Overall scope exceeds requirements of the aquaculture licensing process
b.	Acceptable	
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	
f.	Acceptable	
g.	Acceptable	
2.2 Rationale for the Undertaking		
1 st bullet	Acceptable	
2 nd bullet	Acceptable	
3 rd bullet	Acceptable	
4 th bullet	Acceptable	
5 th bullet	Acceptable	
2.3.1 General Layout		
a.	Acceptable	
b.	Acceptable	Waste management approach in line with Gov. of NL 'The Way Forward' and 'Aquaculture Waste Management Action Plan'

s.13(1)(c)

c.	Acceptable	
d.	N/A	These areas accessed by vessel
e.	Acceptable	During transfers vessel 'docks' at sea, not at a wharf
f.	Acceptable	Former OCI sites
g.	Acceptable	FLR and TC approves and oversees the specifics concerning containment and navigation during the Aquaculture licensing process

2.3.2 Construction

a.	Acceptable	
b.	N/A	Concerning the sea farms
c.	No comment	
d.	No comment	
e.	Acceptable	
f.	N/A	
g.	No comment	
h.	No comment	
i.	No comment	
j.	No comment	
k.	Acceptable	Waste management approach in line with Gov. of NL 'The Way Forward' and 'Aquaculture Waste Management Action Plan'
l.	No comment	

EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
2.3.3 Operation and Maintenance		
a.	Acceptable	
b.	Acceptable	In line with pre-transfer testing required by FLR. Further details on sample type, sample size and testing used will need to be identified

		at the time of pre-transfer testing. DFO/CFIA requirements will need to be addressed at the time of pre-transfer from those Federal agencies.
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	
f.	No comment	
g.	Acceptable	Grieg fish health team including their Veterinarian need to be identified. The roles of the private veterinarian and provincial veterinarians need to be clearly defined.
h.	Acceptable	Assessed and conditionally approved during aquaculture licensing process and pending release of undertaking from EA
i.	Acceptable	Assessed and conditionally approved during aquaculture licensing process and pending release of undertaking from EA
j.	Acceptable	
k.	Acceptable	In line with current planning criteria. Estimates are optimistic.
l.	Acceptable	The project raises the bar above current NL benchmarks in a number of key areas
m.	Acceptable	
n.	Acceptable	
o.	Acceptable	Specific feed type/brand not provided, but understandable given the proprietary nature of formulations. Acceptable based on accounting of triploid nutritional needs as related in EIS.
p.	Acceptable	
q.	Acceptable	
r.	Acceptable	
s.	Acceptable	Procedures used for euthanasia should be approved by the company/private veterinarian.
t.	Acceptable	
u.	No comment	

v.	No comment	
w.	Acceptable	
x.	No comment	
y.	Acceptable	
z.	No comment	
aa.	No comment	

2.3.4 Decommissioning and Rehabilitation

a.	Acceptable	Aquaculture licensing guidance encourages cost estimations, but this has not been required to issue licences. The proponent's capability to remove systems is reflected in its capability to place, maintain, and modify and depopulate systems. Gov. of NL, does not require surety bonds at this time, but has the authority to do so.
b.	No comment	
c.	Acceptable	Aquaculture licensing guidance encourages cost estimations, but this has not been required to issue licences. The proponent's capability to remove systems is reflected in its capability to place, maintain, and modify and depopulate systems. Gov. of NL, does not require surety bonds at this time, but has the authority to do so.
d.	No comment	

EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
2.3.5 Regulatory Framework		
a.	Acceptable	<p>There are reference errors in Table 2.2. When summarizing the required approvals, the EIS relates some approvals issued by MAE to FLR.</p> <p>Section 2.3.2.: There are dated references to Provincial Government Departmental structures. This is likely due to the significant and multiple reorganizations that the Government of NL has implemented in the past 3 years. Not all government guidelines are up to date to reflect these changes.</p>

b.	Acceptable	
c.	Acceptable	
3.1 Alternatives to the Undertaking		
a.	Acceptable	
b.	Acceptable	
3.2 Alternative Methods of Carrying Out the Undertaking		
a.	Acceptable	
b.	Acceptable	
c.	Acceptable	
d.	Acceptable	
4.1 Key Issues		
1 st bullet	Acceptable	
2 nd bullet	Acceptable	
3 rd bullet	Acceptable	
4 th bullet	Acceptable	
4.2.1 Atmospheric Environment		
a.	Acceptable	
b.	Acceptable	
c.	No comment	
d.	No comment	
4.2.2 Aquatic Environment		
a.	Acceptable	Scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process
b.	Acceptable	Concerning broad characterization of variables, the scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process. Concerning site

		specific current profiling, the proponent may be required to profile currents to capture a full lunar cycle to inform its system placements. The aquaculture licensing process ensures completion of this work for each location before issuing site licenses. The information is required to set-up each system to satisfy the warranties expressed Aqualine for its Midgard systems concerning FLR and TC respective interests related to stock containment and navigation.
c.	No comment	It is FLR understanding that the proponent and DFO have had direct discussion on an accepted methodology for the initial bottom characterization of the proponent's site prospects that involve applying remote sensing collaborated with video, as needed, which may serve as a template for further developments of this nature, and therefore will defer to DFO on what was determined acceptable.
d.	No comment	It is FLR understanding that the proponent and DFO have had direct discussion on an accepted methodology for the initial bottom characterization of the proponent's site prospects that involve applying remote sensing collaborated with video, as needed, which may serve as a template for further developments of this nature, and therefore will defer to DFO on what was determined acceptable.
e.	Acceptable	Scope of information provided meets requirements of the aquaculture licensing federal and provincial referral process
f.	No comment	
g.	Acceptable	

EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
4.2.3 Terrestrial Environment		
a.	N/A	
b.	No comment	
c.	Acceptable	Assessed and conditionally approved during aquaculture licensing process and pending release of undertaking from EA
d.	No comment	
e.	Acceptable	Scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process

f.	Acceptable	Scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process
g.	Acceptable	Scope of information meets requirements of the aquaculture licensing federal and provincial referral process
h.	Acceptable	Scope of information meets requirements of the aquaculture licensing federal and provincial referral process
4.2.4 Land and Resource Use		
a.	Acceptable	Scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process
b.	Acceptable	Scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process
c.	Acceptable	
d.	Acceptable	Scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process
e.	No comment	
4.2.5 Heritage Resources		
a.	No comment	
b.	No comment	
c.	No comment	
d.	No comment	
4.2.6 Communities		
a.	No comment	
b.	No comment	
c.	No comment	
d.	No comment	
e.	No comment	
4.2.7 Economy, Employment, and Business		
a.	Acceptable	

b.	Acceptable	
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	
f.	No comment	

COMPONENT STUDIES

EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
4.3.1 Component Study – Wild Atlantic Salmon		
a.	No comment	
b.	No comment	
c.	No comment	
d.	Acceptable	Distance of Rushoon BMA sites (8.7-19km) are farther than principles applied in the Coast of Bays. EIS misrepresents DFO policy concerning distance of salmon farms from registered salmon river (i.e., DFO has never applied a distance of 20-30 km as guidance during the assessment of aquaculture licences. Give the number and locations of salmon rivers in NL, such a policy will effectively prohibit commercial development of coastal salmon production in the province).
e.	Acceptable	
f.	Acceptable	FLR has collected extensive measures of salinity throughout proposed development areas and can verify full salinity seawater at locations.

g.	No comment	
h.	No comment	
i.	No comment	

EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
4.3.2 Component Study – Fish and Fish Habitat		
a.	No comment	It is FLR understanding that the proponent and DFO have had direct discussion on an accepted methodology for the initial bottom characterization of the proponent's site prospects that involve applying remote sensing collaborated with video, as needed, which may serve as a template for further developments of this nature, and therefore will defer to DFO on what was determined acceptable.
b.	No comment	
c.	No comment	
d.	Acceptable	FLR has collected extensive measures of salinity throughout proposed development areas and can verify full salinity seawater at locations. The data has been shared with the proponent. Concerning the benthos, FLR understanding is that the proponent and DFO have had direct discussion on an accepted methodology for the initial bottom characterization of the proponent's site prospects that involve applying remote sensing collaborated with video, as needed, which may serve as a template for further developments of this nature, and therefore will defer to DFO on what was determined acceptable.
e.	Acceptable	
f.	No comment	
g.	No comment	

EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
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4.3.3 Component Study – The Cultural, Recreational, and Commercial Importance of the Waters of Placentia Bay		
a.	Acceptable	Study highlights a trend in fisheries decline for the region. The scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process. Study provides dated reference to FTNOP. Aquaculture information is dated.
b.	No comment	Scope of information provided exceeds requirements of the aquaculture licensing federal and provincial referral process
c.	No comment	
d.	No comment	

EIS Section	Acceptable/Unacceptable/Deficient/ N/A*	Notes
4.3.4 Component Study – Aqualine Midgard Sea-Cage Study		
a.	Acceptable	
b.	Acceptable	
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	
EIS Section	Acceptable/Unacceptable/Deficient/ N/A*	
5.0 Data Gaps	Acceptable	
6.1 Predicted Future Condition of the Environment if the Undertaking Does Not Proceed		
	Acceptable	
6.2 Predicted Environmental Effects of the Undertaking		
a.	Acceptable	Triploid fish are still considered experimental in many jurisdictions
b.	Acceptable	Lumpfish sourced from Gov. of NL support initiative at OSC to source and produce stock for native to NL. In line with a Gov. of NL The Way Forward commitment. Pre-transfer testing for

		FLR/CFIA/DFO required to permit the movement of lumpfish.
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	Siting and mitigations adopted are demonstrated best practices
f.	Acceptable	Controls adopted are demonstrated best practices
g.	Acceptable	
h.	Acceptable	
i.	No comment	
j.	Acceptable	
k.	No comment	Do not believe to be applicable
l.	Acceptable	Necessary to meet the Gov. of NL 'The Way Forward commitments
m.	Acceptable	Approach adopted is best practice and promoted by Gov. of NL 'Aquaculture Waste Management Action Plan'
n.	No comment	
6.3 Accidents and Malfunctions		
a.	Acceptable	
b.	Acceptable	
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	
f.	Acceptable	
6.4 Cumulative Environmental Effects		
a.	Acceptable	
b.	Acceptable	
c.	Acceptable	

d.	Acceptable	
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EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	Notes
6.5 Effects of the Environment on the Project		
	Acceptable	
7.1 Mitigation		
a.	Acceptable	
b.	Acceptable	
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	
f.	Acceptable	
g.	Acceptable	
h.	Acceptable	
i.	Acceptable	
j.	Acceptable	Grieg fish health team including their Veterinarian need to be identified. The roles of the private veterinarian(s) need to be clearly defined. Advise revising the Grieg NL Fish Health Management plan to accurately depict the roles of FLR and DFO.
k.	Acceptable	Grieg fish health team including their Veterinarian need to be identified for fish health management.
l.	Acceptable	
m.	Acceptable	
n.	Acceptable	
o.	Acceptable	
p.	Acceptable	

q.	Acceptable	
r.	Acceptable	
s.	No comment	
t.	No comment	
7.2 Emergency Response/Contingency Plans		
a.	No comment	
b.	No comment	
c.	Acceptable	
d.	Acceptable	
e.	Acceptable	Grieg fish health team including their Veterinarian need to be identified for fish health management
7.3 Waste Management Plan		
a.	Acceptable	Third party service
b.	Acceptable	In line with gov. Aquaculture Waste Management Action Plan. Third party service identified
c.	Acceptable	Third party service
d.	Acceptable	Third party service
e.	Acceptable	Best practices adopted in line with gov. Aquaculture Waste Management Action Plan.
f.	Acceptable	Best practices adopted for feeding and monitoring and reinforced by prescriptive regulatory monitoring standards
g.	No comment	
h.	Acceptable	
EIS Section	Acceptable/Unacceptable/ Deficient/ N/A*	
7.4 Environmental Effects Monitoring and Follow-up Program (EEMP)		
a.	Acceptable	Mandated under regulation as well as 3 rd party certification

b.	No comment	
c.	No comment	
d.	Acceptable	Mandated under licensing and under any performance based agreements between Gov. and proponent
e.	No comment	
f.	Acceptable	Mandated under licensing process and Federal AAR
g.	No comment	
h.	Acceptable	Daily attention to weather and environmental conditions is inherent in the aquaculture marine production for OH&S, feeding and overall site management.
8.0 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE		
	Acceptable	
9.0 ASSESSMENT SUMMARY AND CONCLUSIONS		
	Acceptable	
10.0 PUBLIC PARTICIPATION		
	Acceptable	Proponent has provided the most thorough public consultation and engagement and education outreach for any aquaculture venture in this province, possibly the country
11.0 ENVIRONMENTAL PROTECTION PLAN (EPP)		
	Acceptable	
13.0 PERSONNEL		
	Acceptable	
14.0 COMMITMENTS MADE IN THE EIS		
	Acceptable	
15.0 COPIES OF REPORTS	No comment	

EIS REVIEW

Placentia Bay Atlantic Salmon Aquaculture Project (1834)

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A *
2.1 Study Areas		
a.	JA,BA, CG	
b.	JA, JP, MG	
c.	CH, CG, BA, JK, MG, JP	
d.	JA,DH, VF, JK	ok
e.	CH, CG, JK, BA	
f.	JA, JK, BA, CH, CG	
g.	DW, JK, CH, CG	
2.2 Rationale for the Undertaking		
1 st bullet	All	Ok
2 nd bullet	All	ok
3 rd bullet	All	There was no mention of parasites
4 th bullet	All	ok
5 th bullet	All	ok
2.3.1 General Layout		
a.	All	ok
b.	DH, VF, JP	ok
c.	JP, AD, VF, MG	I don't believe there was any mention of "storage sites"
d.	JP,JS	
e.	CH, CG, JK, BA, JP	
f.	JA, CH, CG, JK, BA, JP, MG	
g.	CH, CG, JK, BA, JP, MG	
2.3.2 Construction		
a.	DW, JK	
b.	JP, DH	
c.	JP, JS	
d.	JP, DH	
e.	JP, CH, JK, DW	
f.	JP, DH, MG	
g.	JP, AD, MG	
h.	JP, VF, JS, AD	ok
i.	JS	
j.	AD, VF, MG, JP	ok
k.	VF, JP, JK, AD	There was no mention about the amount of

		organic waste that would be produced at the hatchery site. They state that it will be composted by BPWMC, however, I'm not sure they could handle the amount of waste.
l.	JP, VF, BA, CG	ok

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
2.3.3 Operation and Maintenance		
a.	DW,JK,CH, DH,VF	ok
b.	DW, JK, CH, BA, CG	
c.	DW, JK, CH	
d.	DW, JK, CH, BA, CG	
e.	DW, JK, CH, BA, CG	
f.	DW, JK, CH, BA, CG, JP	
g.	DW, JK, CH, BA, CG, MG	
h.	DH	
i.	DH	
j.	DW, JK, CH	
k.	DW, JK, CH, VF, JP	ok
l.	DW, JK, CH, BA, CG, MG, VF, JP	ok
m.	DW, JK, CH, BA, CG, MG, JA, JP	
n.	DW, JK, CH, BA, CG, MG, AD, JP	
o.	DW, JK, CH, BA, CG, MG, AD, JP	
p.	DW, JK, CH, BA, CG, MG, VF, JP	ok
q.	JK, CH, BA, CG, MG, VF, JP, AD, JA	n/a
r.	VF, AD, JP,JK, CH, DW	ok
s.	DW, AD, JP	
t.	AD, DW, CH, JK, JP	
u.	AD,DW, CH, JK, VF, JP	No mention of pesticides
v.	VF, JP, AD	ok
w.	VF, JP, AD, CH, JK,BA, CG	n/a
x.	JP, VF, MG	ok

y.	JK, CH, MG, VF, JP, BA, CG, DH	Not applicable
z.	AD, JK, CH, BA, CG, JP	
aa.	JS	
2.3.4 Decommissioning and Rehabilitation		
a.	JK, JS	
b.	JS	
c.	JK, CH, CG, BA, MG, JP	
d.	CH, CG, BA, MG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
2.3.5 Regulatory Frame work		
a.	All	There was no indication of requiring a Pesticide Applicator License (PAL). I know they don't plan to use pesticides, but they may be needed. If so, then a PAL would be required.
b.	All	n/a
c.	All	n/a
3.1 Alternatives to the Undertaking		
a.	JK, BA, CH, CG, JS, AD, MG	
b.	JK, BA, CH, CG, JS, AD, MG	
3.2 Alternative Methods of Carrying Out the Undertaking		
a.	JK, BA, CH, CG, JA, MG	
b.	JK, BA, CH, CG, JA	
c.	JK, BA, CH, CG, VF	n/a
d.	JK, BA, CH, CG, TC, EC	
4.1 Key Issues		I think they are noted throughout the EIS however, they are not spelled out as key issues.
1 st bullet	All	
2 nd bullet	All	
3 rd bullet	All	
4 th bullet	All	
4.2.1 Atmospheric Environment		
a.	CH, CG, JK, BA, JP	
b.	CH, CG, JK, BA, JP	

c.	JP, AD, VF, JS	ok
d.	JP, AD, VF	There is no baseline level indicated for the ambient noise at these sites. It states what noise you might here, but there wasn't any measurements taken at any of the sites to establish was the baseline decibels are.

4.2.2 Aquatic Environment

a.	JK, BA, CH, CG	
b.	JK, BA, CH, CG, JP, MG	
c.	JK, BA, CH, CG, JP	
d.	BA, CG, JP	
e.	JK, BA, CH, CG, JP	
f.	JK, BA, CH, CG, JP, MG	
g.	JK, BA, CH, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
4.2.3 Terrestrial Environment		
a.	JP, BA	
b.	DH	
c.	DH	
d.	DH	
e.	JP, BA	
f.	JP, BA	
g.	JP, BA	
h.	DW, BA, JK	
4.2.4 Land and Resource Use		
a.	CH, CG, JK, BA, JA	
b.	JA, CH, JK	
c.	JA, MG, JK, CH	
d.	BA, CG, JA	
e.	JA	
4.2.5 Heritage Resources		
a.	JA, JS	
b.	JA, JS	
c.	JA, JS	
d.	JA, JS	
4.2.6 Communities		
a.	JA, AD	
b.	JA, AD	

c.	JA	
d.	JA, JS	
e.	JA	
4.2.7 Economy, Employment, and Business		
a.	JA	
b.	JA	
c.	JS	
d.	JA	
e.	JA, JS	
f.	JA	

*Please provide rationale on an additional page, where applicable.

COMPONENT STUDIES

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.1 Component Study – Wild Atlantic Salmon		
a.	CG, BA, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, BA, CG, JK, CH	
d.	CG, BA, CH, JK	
e.	CH, CG, JK, BA, JP, MG	
f.	CH, CG, JK, BA, JP, MG	
g.	CH, CG, JK, BA, JP, MG	
h.	DW, JK, BA, CH, CG, JP, AD, MG, VF	It was vague
i.	DW, VF, AD, TC, JP	Not indicated

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.2 Component Study – Fish and Fish Habitat		
a.	CG, BA, JP, CH, JK	
b.	CG, BA, JP, MG, JK, CH	
c.	CG, BA, JP, MG, CH, JK	
d.	CH, JK, DW, JP	
e.	CH, CG, JK, BA, JP, MG	
f.	CH, CG, JK, BA, JP, MG	
g.	DW, VF, AD, JK, CH, TC, JP, BA, CG	There were no mention of pesticides. They were specifically listed in the guideline, but they were not addressed.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.3 Component Study – The Cultural, Recreational, and Commercial Importance of the Waters of Placentia Bay		
a.	CH, CG, JA, MG	
b.	JA	
c.	MG, JA, CH, CG, BA, JP	
d.	CG, BA, JP, JA, CH, JK	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.4 Component Study – Aqualine Midgard Sea-Cage Study		
a.	CH, JK, CG, BA	
b.	CH, JK, CG, BA	
c.	CH, JK, CG, BA, JP, MG	
d.	CH, JK, CG, BA, JP	
e.	CH, JK, CG, BA, JP	
EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
5.0 Data Gaps	All	I couldn't find it at all. Even on the table of concordance, there is nothing there.
6.1 Predicted Future Condition of the Environment if the Undertaking Does Not Proceed	All	I couldn't find anything related to what the environment would be like if the project didn't proceed.
6.2 Predicted Environmental Effects of the Undertaking		
a.	CG, BA, CH, JK, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, CG, BA, CH, JK	
d.	CG, BA, CH, JK, DW	
e.	JP, CG, BA	
f.	CG, BA, CH, JK, DW, AD, VF	ok
g.	CG, BA, CH, JK, JP, DW	
h.	CH, CG, MG, JA, JP	
i.	JA	
j.	BA, CG, CH, JK, MG, JP	
k.	JP, BA	
l.	CH, JK, JA	
m.	VF, JP	There was no indication of anything other than

		mortalities being “sucked up” from the bottom of the cages. Is there a possibility of other fish, etc. being a “bycatch” of the mort system?
n.	VF, JS, JP, AD	ok
6.3 Accidents and Malfunctions		
a.	BA, CG, CH, JK	
b.	VF, JK, DW, CH, JP, AD	ok
c.	CH, JK, DW, BA, CG, AD, VF, JP	There was no mention of antibiotics, chemotherapeutants or pesticides.
d.	JK, DW, DH	
e.	CH, JA, MG, JK, JP	
f.	All	There was nothing really covered regarding any other potential malfunctions than what was asked previously.
6.4 Cumulative Environmental Effects		
a.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
b.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
c.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
d.	JS, AD, MG, JK, CH, JA, BA, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
6.5 Effects of the Environment on the Project	All	ok
7.1 Mitigation		
a.	CH, CG, JK, BA, MG	
b.	CH, CG, JK, BA	
c.	CH, CG, JK, BA	
d.	CH, CG, JK, BA	
e.	CH, CG, JK, BA	
f.	CH, CG, JK, BA, JP	
g.	CH, CG, JK, BA, JP, DW	

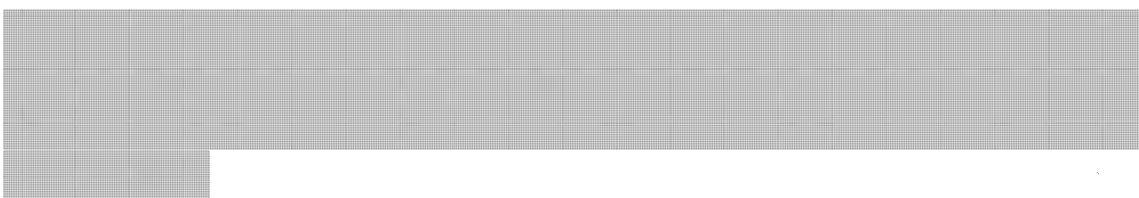
h.	CH, CG, JK, BA, DW	
i.	CH, CG, JK, BA, DW	
j.	CH, CG, JK, BA, DW	
k.	CH, CG, JK, BA, DW	
l.	DW, AD, VF, JP, CH, JK, CG, BA	n/a
m.	DW, CG, BA, CH, JK, JP	
n.	CH, JK, DW, BA, CG, JP, AD, VF	n/a
o.	JK, DW, CH, AD, VF, JP	
p.	BA, CG, CH, JK, MG, JP	
q.	CG, BA, JK, CH, JP, JA	
r.	JK, DW, CH, AD, JP	
s.	JS, JP, VF, AD	ok
t.	JP, BA	
7.2 Emergency Response/Contingency Plans		
a.	VF, JP, MG, DH	Ok
b.	All	Ok
c.	VF, AD, JP, JK, CH, DW	Ok
d.	JK, CH, CG, BA, JP	
e.	DW, JK, CH, AD, VF, JP	ok
7.3 Waste Management Plan		
a.	VF, JP, AD	ok
b.	VF, DW, JP, AD, JK, CH, DH	ok
c.	VF, JP, AD, DH, MG	ok
d.	CH, JK, JP, MG, JA	ok
e.	JK, CH, JP, CG, BA, JP, DW	ok
f.	JK, CH, CG, BA, JP	
g.	VF, DH, JP, CG, BA	ok
h.	VF, JP, JK, AD, JS	It's stated that the sludge will go to BPWMC for composting, but there is nothing supporting that BPWMC can handle that amount or type of waste. Composting the sludge is different than composting food and garden waste.
EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
7.4 Environmental Effects Monitoring and Follow-up Program (EEMP)		
a.	CG, BA, JK, CH, DW, JP	
b.	CG, BA, JK, CH, DW, JP	

c.	BA, JK, CH, DW, JP	
d.	CG, BA, JK, CH, DW, JP	
e.	CG, BA, JP	
f.	CH, JK, CG, BA, JP	
g.	DH	
h.	CH, CG, JK, BA, JP	
8.0 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE	All	ok
9.0 ASSESSMENT SUMMARY AND CONCLUSIONS	All	ok
10.0 PUBLIC PARTICIPATION	JS	
11.0 ENVIRONMENTAL PROTECTION PLAN (EPP)	All	ok
13.0 PERSONNEL	All	ok
14.0 COMMITMENTS MADE IN THE EIS	All	ok
15.0 COPIES OF REPORTS	JS	

*Please provide rationale on an additional page, where applicable.

EIS OPINION:





Name: Vicki Ficzero

Date: June 11/18

s.13(1)(c)

Johnson, Roger

From: Griffiths, Helen
Sent: Thursday, July 12, 2018 3:47 PM
To: Johnson, Roger
Subject: FW: Week of July 16th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Attachments: AES for July 23.docx
Importance: High

I prepared another weekly submission to update on Grieg, due tomorrow noon.
Following statement was in the June 4 version and Ray also sent that version to Jackie in an email format yesterday....
"DFO also identified measures to mitigate any adverse effects." Did we really do this?

From: Pike, Kelly J
Sent: July-12-18 2:57 PM
To: Sooley, Darrin; Griffiths, Helen; Hendry, Christopher; Coffin, David; Snow, Stephen; Tulk, Kirby
Cc: Finn, Ray; Cochrane, Kim
Subject: FW: Week of July 16th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Importance: High

For your input and/or Nil response to me before Noon, Friday, July 13th.

From: Genier, Sylvie
Sent: Thursday, July 12, 2018 2:46 PM
To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Cochrane, Kim <Kim.Cochrane@dfo-mpo.gc.ca>; Hickson, Cindy <Cindy.Hickson@dfo-mpo.gc.ca>; Rossignol, Pauline <Pauline.Rossignol@dfo-mpo.gc.ca>; Wilson, Teresa M <Teresa.Wilson@dfo-mpo.gc.ca>; XCA-Grp, RDGO <XCA-Grp-RDGO@dfo-mpo.gc.ca>; Johal, Sharan <Sharan.Johal@dfo-mpo.gc.ca>; Hébert, Linda M <Linda.Hebert@dfo-mpo.gc.ca>; Pallard, Jessica <Jessica.Pallard@dfo-mpo.gc.ca>; Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Couturier-Dubé, Geneviève <Genevieve.Couturier-Dube@dfo-mpo.gc.ca>; Kaba, Kyle <Kyle.Kaba@dfo-mpo.gc.ca>; Landry, Anne <Anne.Landry@dfo-mpo.gc.ca>
Subject: Week of July 16th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Importance: High

Hi all / Bonjour,

Please note this request is for items pertaining to Aquatic Ecosystems Sector only /
Veuillez noter que cette demande concerne uniquement les articles appartenant au secteur des écosystèmes aquatiques

Please update (in the language of your choice) the attached report with a regional perspective and return to me by 10am on Monday, July 16th (Eastern Time).

Please note if no response is received by the timeline provided, it will be considered a NIL response.

Please note this request is for the period of July 23rd to August 3rd

Veuillez fournir vos données (dans la langue de votre choix), incluant la perspective régionale pour le rapport ci-joint par 10h00 lundi le 16 juillet. (heure de l'est).

S'il vous plaît noter si aucune réponse n'est reçue par le temps fourni, il sera considéré comme une réponse NUL.

SVP noter que cette demande est pour la période du 23 juillet au 3 août

Thank you/Merci.

Sylvie Genier

Scheduling Coordinator / Coordinatrice de l'agenda

Senior Assistant Deputy Minister / Bureau du sous-ministre adjoint

Ecosystems & Fisheries Management / Écosystèmes et Gestion de Pêches

613-993-2734

=====

Guidelines for Issues, Reports & Consultations report / Lignes directrices pour le rapport d'enjeux, de rapports et de consultations:

Issues expected for the next two weeks (from July 23 – August 3, 2018)

Enjeux prévus pour les prochaines deux semaines (à partir du 23 juillet – 3 août)

Anticipated reports, studies, publications, etc. Please identify any reports expected for public release whether they are from DFO or from others but with implications for DFO (to be released before August 3, 2018).

Rapports anticipés, études, publications, etc. Veuillez identifier tous les rapports en attente pour publication - même s'il s'agit d'un rapport du MPO ou provenant d'autres organismes avec des implications pour le MPO (date de publication avant le 3 août).

Meetings/consultation planned for July 23 – August 3, 2018

Rencontres/consultations prévues pendant la période à partir du 23 juillet – 3 août 2018

Please provide **ONLY** information that the Minister and/or Minister's Office should be made aware of because of the potential for it to attract public or media attention. For issues, please explain why it is an issue, anticipated reaction and plans to manage the reaction. Please ensure your input is signed off by your DMB member.

When you transmit the info, please indicate which issues, reports or consultations should be included in the Week at a Glance - these are the same issues that the Commissioner or SADM will be raising during the Round Table.

Veuillez fournir uniquement les renseignements dont le ministre ou le bureau du ministre devraient prendre connaissance parce qu'ils peuvent potentiellement attirer l'attention du public ou des médias. En ce qui concerne les enjeux, veuillez expliquer pourquoi il s'agit d'un enjeu, quelle est la réaction anticipée et quels sont les plans devant servir à gérer cette réaction. Veuillez-vous assurer que votre contribution est signée par votre membre du Conseil du ministère.

Lorsque vous transmettez les renseignements, veuillez indiquer quels enjeux, rapports ou consultations devraient être inclus dans le Coup d'œil sur la semaine – ceux-ci correspondent aux enjeux que le Commissaire ou le Sous-ministre adjoint principal soulèveront durant la table-ronde.

TAB 10 - UPCOMING ISSUES AND DECISIONS /
ONGLET 10 – PROCHAINS ENJEUX ET DÉCISIONS

SECRET

#	ISSUE / PROBLÈME	DESCRIPTION	IMPACT / EFFET	NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
Aquatic Ecosystems Sector / Secteur des écosystèmes aquatiques – July 23rd to August 3rd / du 23 juillet au 3 août				

Johnson, Roger

From: Gordanier, Tania
Sent: Thursday, July 12, 2018 4:22 PM
To: Johnson, Roger
Subject: RE: DFO comments Grieg Aquaculture EIS

Thanks!

Tania

Tania Gordanier

Manager, Contaminated Sites & Major Project Coordination
Gestionnaire, Coordination des Sites Contaminés & des Projets Majeurs
Fisheries Protection Program | Programme de protection des pêches
Telephone/ téléphone (613) 282-9150
Fisheries and Oceans Canada / Pêches et Océans Canada
200 Kent Street / 200 rue Kent, Mailstop 8E240
Ottawa, Ontario K1A 0E6

From: Johnson, Roger
Sent: July 12, 2018 12:30 PM
To: Pilgrim, Bret; Decker, Shelley
Cc: Gordanier, Tania
Subject: FW: DFO comments Grieg Aquaculture EIS

Bret and Shelly [REDACTED]

Tania -> we are still working on media lines.

From: Johnson, Roger
Sent: Thursday, July 12, 2018 1:37 PM
To: 'Squires, Susan' <SusanSquires@gov.nl.ca>
Cc: Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: DFO comments Grieg Aquaculture EIS

Please see attached the comments from the DFO all sector review of the above mentioned EIS.

I have copied Chris Hendry and Carol Grant as they are the DFO representatives on the EA committee.

Due to the complexity and inaccuracy of the table provided, and the tight timelines, the table provided by the EA Committee chair has not been completed. Please be advised that DFO has reviewed all sections of the EIS that pertain to our mandate.

If you have any questions or comments please feel free to contact me directly.

Thanks

Roger Johnson
Sr. Biologist
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell) s.16(2)(c)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

No further information has been removed or severed from this page

Johnson, Roger

From: Ruddock, Stella D
Sent: Friday, July 13, 2018 4:58 PM
To: Johnson, Roger; Griffiths, Helen
Cc: Whiffen, Sam
Subject: Anticipatory lines - EA

Hi Roger and Helen,

Sam reviewed the media lines below and suggested we give some indication of what we assess on i.e. our mandate. For example, would we clarify and say we reviewed the project for serious harm to fish and fish habitat and provided advice on how to mitigate any impacts?

I'll be back in the office on Tuesday, and will be in touch then to update the lines. In the meantime, if anything comes up regarding this issue on Monday, please contact Sam Whiffen.

Thanks,
Stella

Anticipatory Media Lines

Environmental assessment of Grieg's proposed operation in Placentia Bay

Issue

In 2015, Grieg NL registered plans to establish an ~~expand~~ aquaculture operation in Placentia Bay. In 2016, the provincial Department of Environment and Conservation (now known as Municipal Affairs and Environment) released the undertaking from further environmental assessment. The release was challenged in court, resulting in a court-ordered Environmental Impact Statement (EIS). As per normal provincial Environmental Assessment (EA) process, DFO has been asked to provide advice to the EA Committee.

Strategic Considerations and Public Environment

Grieg's proposed aquaculture operation in Placentia Bay has been under intense media scrutiny from the beginning due to criticism from anti-aquaculture groups.

Some disapproval may be redirected towards DFO by groups concerned that this project will damage wild Atlantic Salmon stocks, and who feel DFO should block the project. The South Newfoundland population of Atlantic Salmon has been assessed under COSEWIC as "threatened." This may add to concerns about the effects Grieg's activities will have on wild salmon.

Recommendation

These media lines are anticipatory if inquiries are received related to DFO's role in the Environmental Impact Statement process. Aquaculture is a provincial lead in NL; therefore, media will be referred to the province for questions outside of DFO's area of responsibility.

Media lines (Responsive)

- DFO has an advisory role in provincial Environment Assessment (EA) processes. DFO routinely reviews provincial EA registrations, Environmental Preview Reports or, as in this case, Environmental Impact Statements, and provides advice relevant to our mandate.

- DFO-NL has concluded a comprehensive review of the Grieg EIS and has provided advice to the Provincial EA Committee.
- While DFO's responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management, the decision to release the aquaculture project from environmental assessment lies with the Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information.
- Upon completion of the current Environmental Assessment process, and if the Province releases the project, the proponent will be subject to subsequent regulatory approvals for aquaculture site licenses and introductions and transfers, both of which will involve DFO as well as Provincial regulators. More information can be found here: (add link).

Stella Ruddock
Communications Advisor (Ecosystems Management)
Newfoundland and Labrador Region
Fisheries and Oceans Canada/Government of Canada
Stella.Ruddock@dfo-mpo.gc.ca/ Tel: 709-772-7630
Media Inquiries: Media.NL@dfo-mpo.gc.ca/ Tel: 709-772-3375

Follow us on Twitter! @DFO_NL

Pike, Kelly J

From: Pike, Kelly J
Sent: Monday, July 16, 2018 11:37 AM
To: Genier, Sylvie
Subject: RE: Week of July 16th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Attachments: Week of July 16 2018-AES issues Reports and Consultations Report (Re Greig EIS) (2) (002).docx

Hi Sylvie;

Sorry about that, please see attached.
Let me know if you require anything further.

Thanks Donna!

From: Genier, Sylvie
Sent: Monday, July 16, 2018 11:09 AM
To: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>
Subject: RE: Week of July 16th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Importance: High

Hi Donna,
Can you please send me the electronic version?
Thanks

Sylvie Genier
Scheduling Coordinator / Coordinatrice de l'agenda
Assistant Deputy Minister / Bureau du sous-ministre adjoint
Aquatic Ecosystems Sector / Secteur des écosystèmes aquatiques
613-993-2734

From: Pike, Kelly J
Sent: July-16-18 9:24 AM
To: Genier, Sylvie
Subject: Week of July 16th - AES Issues, Reports and Consultations Report / Upcoming Decisions

Hi Sylvie;

Please see attached.

Thanks Donna Nolan

For

Kelly Pike
Administrative Officer, Ecosystems Management
Regional Director's Office
Fisheries and Oceans Canada/Government of Canada

80 East White Hills Road, PO Box 5667

St. John's, NL A1C 5X1

Kelly.Pike@dfo-mpo.gc.ca /Tel: 709 772-7894/Fax: 709 772-7862/Cell: [REDACTED]

From: Genier, Sylvie

Sent: Thursday, July 12, 2018 2:46 PM

To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Cochrane, Kim <Kim.Cochrane@dfo-mpo.gc.ca>; Hickson, Cindy <Cindy.Hickson@dfo-mpo.gc.ca>; Rossignol, Pauline <Pauline.Rossignol@dfo-mpo.gc.ca>; Wilson, Teresa M <Teresa.Wilson@dfo-mpo.gc.ca>; XCA-Grp, RDGO <XCA-Grp-RDGO@dfo-mpo.gc.ca>; Johal, Sharan <Sharan.Johal@dfo-mpo.gc.ca>; Hébert, Linda M <Linda.Hebert@dfo-mpo.gc.ca>; Pallard, Jessica <Jessica.Pallard@dfo-mpo.gc.ca>; Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Couturier-Dubé, Geneviève <Genevieve.Couturier-Dube@dfo-mpo.gc.ca>; Kaba, Kyle <Kyle.Kaba@dfo-mpo.gc.ca>; Landry, Anne <Anne.Landry@dfo-mpo.gc.ca>

Subject: Week of July 16th - AES Issues, Reports and Consultations Report / Upcoming Decisions

Importance: High

Hi all / Bonjour,

**Please note this request is for items pertaining to Aquatic Ecosystems Sector only /
Veuillez noter que cette demande concerne uniquement les articles appartenant au secteur des écosystèmes aquatiques**

Please update (in the language of your choice) the attached report with a regional perspective and return to me **by 10am on Monday, July 16th (Eastern Time).**

Please note if no response is received by the timeline provided, it will be considered a NIL response.

Please note this request is for the period of July 23rd to August 3rd

Veuillez fournir vos données (dans la langue de votre choix), incluant la perspective régionale pour le rapport ci-joint **par 10h00 lundi le 16 juillet. (heure de l'est).**

S'il vous plaît noter si aucune réponse n'est reçue par le temps fourni, il sera considéré comme une réponse NUL.

SVP noter que cette demande est pour la période du 23 juillet au 3 août

Thank you/Merci.

Sylvie Genier

Scheduling Coordinator / Coordinnatrice de l'agenda

Senior Assistant Deputy Minister / Bureau du sous-ministre adjoint

Ecosystems & Fisheries Management / Écosystèmes et Gestion de Pêches

613-993-2734

=====

Guidelines for Issues, Reports & Consultations report / Lignes directrices pour le rapport d'enjeux, de rapports et de consultations:

s.16(2)(c)

Issues expected for the next two weeks (from July 23 – August 3, 2018)

Enjeux prévus pour les prochaines deux semaines (à partir du 23 juillet – 3 août)

Anticipated reports, studies, publications, etc. Please identify any reports expected for public release whether they are from DFO or from others but with implications for DFO (to be released before **August 3, 2018**).

Rapports anticipés, études, publications, etc. Veuillez identifier tous les rapports en attente pour publication - même s'il s'agit d'un rapport du MPO ou provenant d'autres organismes avec des implications pour le MPO (date de publication avant le **3 août**).

Meetings/consultation planned for July 23 – August 3, 2018

Rencontres/consultations prévues pendant la période à partir du 23 juillet – 3 août 2018

Please provide **ONLY** information that the Minister and/or Minister's Office should be made aware of because of the potential for it to attract public or media attention. For issues, please explain why it is an issue, anticipated reaction and plans to manage the reaction. Please ensure your input is signed off by your DMB member.

When you transmit the info, please indicate which issues, reports or consultations should be included in the Week at a Glance - these are the same issues that the Commissioner or SADM will be raising during the Round Table.

Veuillez fournir uniquement les renseignements dont le ministre ou le bureau du ministre devraient prendre connaissance parce qu'ils peuvent potentiellement attirer l'attention du public ou des médias. En ce qui concerne les enjeux, veuillez expliquer pourquoi il s'agit d'un enjeu, quelle est la réaction anticipée et quels sont les plans devant servir à gérer cette réaction. Veuillez-vous assurer que votre contribution est signée par votre membre du Conseil du ministère.

Lorsque vous transmettez les renseignements, veuillez indiquer quels enjeux, rapports ou consultations devraient être inclus dans le Coup d'œil sur la semaine – ceux-ci correspondent aux enjeux que le Commissaire ou le Sous-ministre adjoint principal soulèveront durant la table-ronde.

TAB 10 - UPCOMING ISSUES AND DECISIONS /
ONGLET 10 – PROCHAINS ENJEUX ET DÉCISIONS

SECRET

#	ISSUE /PROBLÈME	DESCRIPTION	IMPACT / EFFET	NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
Aquatic Ecosystems Sector / Secteur des écosystèmes aquatiques – June 11th to June 22nd / du 11 juin au 22 juin				
1	Grieg NL Placentia Bay Project Environmental Assessment	On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment (MAE). This action initiated the start of a 50 day public review process and a review by expert departments and agencies including DFO. The provincial Minister of MAE has extended the public review period of the Environmental Impact Statement (EIS) for the Placentia Bay Atlantic Salmon Aquaculture Project until July 25, 2018. This is in response to approximately 20 requests received to extend the public review period.	DFO initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. This review included a CSAS peer review process by DFO Science (Science Response).	<p>DFO submitted comments to the Environmental Assessment Committee (EAC) on July 12. The EAC will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal Affairs and Environment. All comments received through this public comment period, including DFO comments, will be posted on the provincial website.</p> <p>Draft media lines have been prepared in the event that DFO receives inquiries once DFO comments have been posted on the provincial website.</p> <p>The Provincial Minister of Municipal Affairs and Environment's decision on the acceptability of the EIS is due on July 31, 2018.</p> <p>The Minister's recommendation to provincial Cabinet is due by August 30, 2018, and Cabinet will inform the proponent of its decision, for which there is no deadline.</p>

**TAB 10 - UPCOMING ISSUES AND DECISIONS /
ONGLET 10 – PROCHAINS ENJEUX ET DÉCISIONS**

SECRET

#	ISSUE / PROBLÈME	DESCRIPTION	IMPACT / EFFET	NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
2				

No information has been removed or severed from this page

Finn, Ray

From: Griffiths, Helen
Sent: Monday, July 16, 2018 1:23 PM
To: Cochrane, Kim
Cc: Finn, Ray
Subject: RE: Weekly MINO Call - Reminder

Not sure this made it to MINO call last week, so submitting for this week

Grieg NL Placentia Bay Project Environmental Assessment

On May 22, 2018 Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. submitted the Environmental Impact Statement (EIS) to the Provincial Department of Municipal Affairs and Environment (MAE). This action initiated the start of a 50 day public review process and a review by expert departments and agencies including DFO. The provincial Minister of MAE has extended the public review period of the Environmental Impact Statement (EIS) for the Placentia Bay Atlantic Salmon Aquaculture Project until July 25, 2018. This is in response to approximately 20 requests received to extend the public review period.

DFO initiated a multi sectoral review of the information to determine potential effects of the proposed project on fish, fish habitat, fisheries resources, sensitive areas and aquatic species including species at risk. This review included a CSAS peer review process by DFO Science (Science Response).

DFO submitted comments to the Environmental Assessment Committee (EAC) on July 12. The EAC will make recommendation on the acceptability of the EIS to the Provincial Minister of Municipal Affairs and Environment. All comments received through this public comment period, including DFO comments, will be posted on the provincial website.

Draft media lines have been prepared in the event that DFO receives inquiries once DFO comments have been posted on the provincial website.

The Provincial Minister of Municipal Affairs and Environment's decision on the acceptability of the EIS is due on July 31, 2018.

The Minister's recommendation to provincial Cabinet is due by August 30, 2018, and Cabinet will inform the proponent of its decision, for which there is no deadline.

From: Cochrane, Kim
Sent: July-16-18 12:01 PM
To: Sooley, Darrin; Hendry, Christopher; Griffiths, Helen; Tulk, Kirby; Snow, Stephen
Cc: Finn, Ray; Pike, Kelly J
Subject: RE: Weekly MINO Call - Reminder
Importance: High

Friendly reminder the weekly MINO call is scheduled for Wednesday, July 18, 2018.

Please advise if you have any input to bring forward for this call.

Deadline Date: Tuesday, July 17, 2018 – 10:00am

Kim

Kim Cochrane

Manager, Program Services

Ecosystems Management Branch / Direction de la gestion des écosystèmes

Fisheries and Oceans Canada / Pêches et Océans Canada

Northwest Atlantic Fisheries Centre / Centre des pêches de l'Atlantique nord-ouest

PO Box 5667, 80 East White Hills Road / CP 5667 80, chemin White Hills est

St. John's NL A1C 5X1 / Saint-Jean T-N-L A1C 5X1

Phone: 709-772-7832

kim.cochrane@dfo-mpo.gc.ca

No information has been removed or severed from this page

Johnson, Roger

From: Johnson, Roger
Sent: Tuesday, July 17, 2018 2:20 PM
To: Ruddock, Stella D
Cc: Griffiths, Helen
Subject: RE: UPDATED: Anticipatory lines - EA

I have discussed with Helen.

See below – the text highlighted is probably not needed.

From: Ruddock, Stella D
Sent: Tuesday, July 17, 2018 12:17 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: UPDATED: Anticipatory lines - EA

Hi Roger,

Please see below for updated lines (particularly changes in red and green text), and please give me a call to discuss when you have a moment. I want to clarify DFO's role, as I know we have several responsibilities under the EIS process.

Thanks,
Stella

Anticipatory Media Lines

Environmental assessment of Grieg's proposed operation in Placentia Bay

Issue

In 2015, Grieg NL registered plans to establish an ~~expand~~ aquaculture operation in Placentia Bay. In 2016, the provincial Department of Environment and Conservation (now known as Municipal Affairs and Environment) released the undertaking from further environmental assessment. The release was challenged in court, resulting in a court-ordered Environmental Impact Statement (EIS). As per normal provincial Environmental Assessment (EA) process, DFO has been asked to provide advice to the EA Committee.

Strategic Considerations and Public Environment

Grieg's proposed aquaculture operation in Placentia Bay has been under intense media scrutiny from the beginning due to criticism from anti-aquaculture groups.

Some disapproval may be redirected towards DFO by groups concerned that this project will damage wild Atlantic Salmon stocks, and who feel DFO should block the project. The South Newfoundland population of Atlantic Salmon has been assessed under COSEWIC as "threatened." This may add to concerns about the effects Grieg's activities will have on wild salmon.

Recommendation

These media lines are anticipatory if inquiries are received related to DFO's role in the Environmental Impact Statement process. Aquaculture is a provincial lead in NL; therefore, media will be referred to the province for questions outside of DFO's area of responsibility.

Media lines (Responsive)

- DFO has an advisory role in provincial Environment Assessment (EA) processes. DFO routinely reviews provincial EA registrations, Environmental Preview Reports or, as in this case, Environmental Impact Statements, and provides advice relevant to our mandate of protecting Canada's oceans and other aquatic ecosystems from negative impacts.
- DFO-NL has concluded a comprehensive review of the Grieg EIS and has provided advice to the Provincial EA Committee related to potential environmental effects and required mitigation measures for the proposed aquaculture operation.
- While DFO's responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management (should we say more about our role here as well?), the decision to release the aquaculture project from environmental assessment lies with the Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information on their role.
- Upon completion of the current Environmental Assessment process, and if the Province releases the project, the proponent will be subject to subsequent regulatory approvals for aquaculture site licenses and introductions and transfers, both of which will involve DFO as well as Provincial regulators. More information can be found here: (add link).

Stella Ruddock
 Communications Advisor (Ecosystems Management)
 Newfoundland and Labrador Region
 Fisheries and Oceans Canada/Government of Canada
Stella.Ruddock@dfo-mpo.gc.ca/ Tel: 709-772-7630
 Media Inquiries: Media.NL@dfo-mpo.gc.ca/ Tel: 709-772-3375

Follow us on Twitter! @DFO_NL

Griffiths, Helen

From: Ruddock, Stella D
Sent: July-18-18 9:50 AM
To: Finn, Ray
Cc: Dunderdale, Sara; Whiffen, Sam; Griffiths, Helen; Johnson, Roger; Pike, Kelly J
Subject: UPDATED: FOR APPROVAL: Anticipatory lines - EA

Hi Ray,

I've highlighted the requested change below. Please let me know of any other concerns.

Thanks,
Stella

Anticipatory Media Lines

Environmental assessment of Grieg's proposed operation in Placentia Bay

Issue

In 2015, Grieg NL registered plans to establish an aquaculture operation in Placentia Bay. In 2016, the provincial Department of Environment and Conservation (now known as Municipal Affairs and Environment) released the undertaking from further environmental assessment. The release was challenged in court, resulting in a court-ordered Environmental Impact Statement (EIS). As per normal provincial Environmental Assessment (EA) process, DFO has been asked to provide advice to the EA Committee.

Strategic Considerations and Public Environment

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Media lines (Responsive)

- DFO has an advisory role in provincial Environment Assessment (EA) processes. DFO routinely reviews provincial EA registrations, Environmental Preview Reports or, as in this case, Environmental Impact Statements, and provides advice relevant to our mandate of protecting Canada's oceans and other aquatic ecosystems from negative impacts.
- DFO-NL has concluded a comprehensive review of the Grieg EIS and has provided advice to the Provincial EA Committee (add link to letter of advice).
- While DFO's responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management, the decision to release the aquaculture project from environmental assessment, or not, lies exclusively with the

Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information on their role.

- Upon completion of the current Environmental Assessment process, and if the Province releases the project, the proponent will be subject to subsequent regulatory approvals for aquaculture site licenses and introductions and transfers, both of which will involve DFO as well as Provincial regulators. More information can be found here: (add link).

Stella Ruddock
Communications Advisor (Ecosystems Management)
Newfoundland and Labrador Region
Fisheries and Oceans Canada/Government of Canada
Stella.Ruddock@dfo-mpo.gc.ca/ Tel: 709-772-7630
Media Inquiries: Media.NL@dfo-mpo.gc.ca/ Tel: 709-772-3375

Follow us on Twitter! @DFO_NL

Johnson, Roger

From: Finn, Ray
Sent: Friday, July 20, 2018 11:55 AM
To: Johnson, Roger
Cc: Careen, Ellen
Subject: FW: FOR INFO: 2018-001-01337 re: Placentia Bay Aquaculture Project
Attachments: MECTS-#3937429-v1-Main_Docs_2018-001-01337.pdf

FYI only – no response from our Min is required at this time – our Min was simply copied

Ray

From: Butler, Annette
Sent: Friday, July 20, 2018 9:43 AM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>; Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>
Subject: FW: FOR INFO: 2018-001-01337 re: Placentia Bay Aquaculture Project

Good morning Ray,

The attached is provided for your review/information. Please advise if you have any concerns.

Thank you,

Annette

From: Shaw, Kevin
Sent: 2018-July-19 5:16 PM
To: Butler, Annette
Cc: Pallard, Jessica; Dawe, Lana; Valerio, Michael; Newman, Jesse; Jaremek, Daniel
Subject: FOR INFO: 2018-001-01337 re: Placentia Bay Aquaculture Project

Docket No.: 2018-001-01337
Subject: Placentia Bay Aquaculture Project
Addressed to: Minister Parsons
Correspondent: [REDACTED]

Attached is correspondence that the Minister was only copied on. The Ministerial Correspondence Unit (MCU) has assessed that a reply from the Minister is not necessary and will not take any further action.

This INFO docket is being sent to you for your information only; please distribute as appropriate to others within DFO who may have an interest in the issue(s) raised in the correspondence.

Kevin Shaw

Writer/Editor, Ministerial Correspondence Unit
Fisheries and Oceans Canada / Government of Canada
Kevin.Shaw@dfo-mpo.gc.ca / Tel: 613-949-7521

s.19(1)

Rédacteur/Réviser, Unité de la correspondance ministérielle
Pêches et Océans Canada / Gouvernement du Canada
Kevin.Shaw@dfo-mpo.gc.ca / Tél. : 613-949-7521

XNCR-GrpCW/RC@dfo-mpo.gc.ca to contact all MCU Writers / pour rejoindre tous les rédacteurs d'UCM
XNCR-GrpCA/AC@dfo-mpo.gc.ca to contact all MCU Analysts / pour rejoindre tous les analystes d'UCM

No information has been removed or severed from this page

JUL 05 2018

Memorandum -

- do let for info,

as reply needed.

V:

2018-001-01337

July 1, 2018

Honourable Andrew Parsons, Minister of Justice
& Minister Responsible for the Environment/EIS Process
Government of Newfoundland Labrador
Confederation Building
St. John's, NL, A1B 4J6

CABINET DU MINISTRE
OFFICE OF THE MINISTER

2018 -07- 09

Received by MCCU
Reçu par UCCM

Dear Minister:

**ADAPT: Aquaculture's Develop and Perish Trajectory
In Inner Placentia Bay, Newfoundland**

Further to your press statements of May 24, 2018, soliciting public comments on Grieg Newfoundland's Placentia Bay Aquaculture Project's Environmental Impact Statement (EIS), please accept the enclosed, **ADAPT: Aquaculture's Develop and Perish Trajectory in Inner Placentia Bay, Newfoundland.**

As presently conceived and contrary to the claims of the Proponent, the trajectory of the Project presents major and significant negative effects on key elements of the sensitive ecosystem of Inner Placentia Bay and contiguous areas, particularly the death knell of the local coastal cod stock and migrating wild salmon; it all but precludes other developments and usages, thereto; and, it paints Newfoundland a pariah in terms of international leadership on the stewardship of its environment.

The EIS and my comments encroaches activities and jurisdiction of the federal government and a copy has been forwarded to the Minister of Fisheries and Oceans.

I recommend the provincial government resolve to further review this project, independently and judiciously, in light of its serious impacts, and adapt aquaculture so as to broach a more lasting contribution for the people and environment of Newfoundland and Labrador.

If you remain unconvinced of the arguments put forward here and require further elaboration or information, please contact me at your convenience.

Respectfully yours,



s.19(1)

✓ Cc. Minister, Fisheries & Oceans

**ADAPT: Aquaculture's Develop and Perish Trajectory
In Inner Placentia Bay, Newfoundland**

*Public Comments on Grieg Newfoundland's Placentia Bay Aquaculture Project's
Environmental Impact Statement of May 2018*

To: Honourable Andrew Parsons, Minister of Justice
& Minister Responsible for the Environment/EIS Process
Government of Newfoundland Labrador

Cc: Minister, Fisheries & Oceans (DFO)

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Table of Contents

- Introduction
- 1. General Determinations
- 2. Alternatives
- 3. Fish Habitat & Fish Impacted
- 4. Valued Economic Components Impacted
- 5. Effects: Residual & Cumulative
- 6. Resolution
- Bibliography*

Introduction

Adults and schoolchildren throughout Newfoundland and Labrador have a long history of being raised on the post-Confederation political mantra of develop *or* perish. Grieg Newfoundland's Placentia Bay Aquaculture Project's (hereafter, the 'Project') Environmental Impact Statement (EIS) is the culmination of that line of thought in its present trajectory to develop *and* perish. The premise of the enclosed review, **ADAPT: Aquaculture's Develop and Perish Trajectory in Inner Placentia Bay, Newfoundland**, is two-fold, the environment and equality of future opportunity: Specifically, 1) allaying the significant adverse effects to the aquatic environment of Inner Placentia Bay and contiguous areas; and 2) resolving greater socio-economic equality of opportunity for future generations than currently envisaged by Grieg NL (hereafter, the 'Proponent') with the near-shore, sea cage aquaculture components of the Project in the environs, thereto. The people of Canada, and Newfoundland and Labrador, in particular, are so often asked to rekindle long overdue international leadership in and with the marine environment. With foresight, integrity, perseverance, hard work, and re-prioritizing financial support, the Project can be adapted to reach such a noteworthy global objective, with tangible returns for all concerned.

1. General Determinations

General determinations review the conflicts in Project sanction, public input, marine location, affected area, rationale, funding and related matters.

I. Conflict of Interest (Provincial)

- i. The provincial Cabinet initially presents itself in a conflict of interest by formally releasing the project from the EIS process. It only reluctantly consents to a further Cabinet review of public comments at the direction of the Supreme Court of Newfoundland Labrador, whose decision it is also appealing.
- ii. The Cabinets of two successive provincial governments have set the Project as policy.
- iii. The Cabinet, in the interim, directed considerable financial and other resources to the Project.
- iv. The Proponent has accepted an undisclosed offer of exclusive rights to use Placentia Bay from the provincial government, and it is assumed it is in perpetuity.
- v. The Premier has stated during the review process the provincial government's plans to double aquaculture production levels in the very near term.
- vi. The Minister of Justice, Newfoundland and Labrador, as a senior member of Cabinet, is both a proponent of the Project and adjudicator of the environmental review's recommendation to Cabinet.
- vii. Senior civil servants who advise the Minister's recommendation unfairly place themselves in a prejudicial position. Their visits to Norway, frequent formal and backchannel communications with the Proponent and Cabinet during the registration, judicial, and review processes can predispose even the best intentioned to the Project.

Therefore, the provincial Cabinet and the Minister are not truly independent and at arms length in the environmental impact process as currently invoked, and certainly contravene its spirit and intent.

II. Conflict of Interest (Federal)

- i. The Project encroaches on federal jurisdiction for fisheries and oceans, and the environment (with additional involvement for financial support from a federal agency).
- ii. The federal Ministers have fiduciary and/or legal responsibility for the marine environment and all areas contiguous, thereto.
- iii. The federal government has already supported the project with considerable financial and other support, prior to the provincial Cabinet's determination of the current EIS process.
- iv. The Proponent acknowledges to be 'encouraged and advised' by DFO to move their focus to Placentia Bay (presumably, from an original undertaking in Burgeo).
- v. DFO's Science Advisory Secretariat undertakes five-year wild salmon stock assessments. The Placentia Bay Salmon Fishing Area (SFA 10) assessment last occurs in 2013, and the information is incorporated into the Proponent's EIS. A more recent assessment has been compiled, with critically updated information on a more significantly depleted stock, offshore survival, and aquaculture encroachment. It is due 2018 but it is reasonable to infer that it is being withheld.
- vi. DFO is in conflict with itself in that DFO's Ocean Strategy incorporates a No Net Loss policy.

- vii. DFO's active restoration with other stakeholders of lost habitat in Placentia Bay, including two areas adjacent to the Project, is conflicted and likely expansion will be discouraged in the area.

Therefore, despite the conflict of interest in its previous and ongoing activities related to the proposed Project, DFO and other federal Departments would be responsible parties with considerable bearing in the outcome of any independent, arms length environmental impact process related to the country's waters, habitat and environs, including those of Placentia Bay. They must insist, prior to Project sanction, upon a precautionary approach be taken when responding to the Project's EIS so that it is made in accord with the federal government's Ocean Strategy, the pending assessment of wild salmon (2018), No Net Loss policy, and other instruments; and, be fully engaged in a more formal review.

III. Public Input

- i. Public input has been requested as the Minister prepares a recommendation to and by the provincial Cabinet.
- ii. Public input should play an important role in the determination of the environmental effects, the Proponent's analyses and facts.
- iii. The Minister and Cabinet should allow for a different interpretation of the Proponent's data and to question the credibility of the conclusion, which an independent recommendation would do.

Therefore, public transparency and accountability is needed in the adjudication process. It means not leaving the recommendation of project sanction to one Minister and officials. The public perception is they have put themselves in the position to unfairly discount or justify negative environmental effects because they are already predisposed to support the Proponent.

IV. Marine Location

- i. Inner Placentia Bay, as defined by Brown, is from Fox Harbour to Paradise (53kms.) to Swift Current (61kms.), or 2,000 square kilometers. Its contiguous areas include the well-known Oderin, White Sail, and Merasheen fishing banks, as well as offshore Argentia-Point Verde. The contiguous areas may include another 1,000 square kilometers.
- ii. It incorporates the three major migration routes and navigational corridors of the Western Channel, Central Channel and Eastern Channel. These channels are the main influence in the distribution of marine life. The Eastern Channel is already industrially occupied quite heavily.
- iii. Inner Placentia Bay and two remaining pristine Channels have a unique complex of variables.
- iv. They have centuries of cultural, economic, indigenous, social history and social interaction between the peoples and ecosystem within Inner Placentia Bay and its adjacent communities.
- v. Its fishers have practiced a mainly small boat, sustainable fishery (when left to their own resources), as evident by the fact that it still has a viable, separate cod mass and spawning individuals.
- vi. A considerable portion of the 1,500 inshore fishers in South Coast DFO Division 3Ps, anecdotally identified 400 cabin owners, and 200 ('on any given day') recreational boat owners either live in, make their livelihood in, raise their families in, enhance their lifestyle in, or hail from Inner Placentia Bay. The project will adversely affect each and every one of them.

- vii. The Project's marine locales are huge, with its sea cages, transit points, and servicing routes encroaching fully on Inner Placentia Bay and its adjacent areas. 11 sea cages sites are proposed, covering an area of +/- 200ha per site. Rushoon, Merasheen, and Red Island management areas have three sites, each, with 12 sea cages, per site. Two seasonal sites are proposed for Long Harbour with 6 (or maybe 12) sea cages. The total is 120 - 132 sea cages. Each cage has a circumference of 160m and diameter of 51m, contains 160,000 fish per cage, consuming (on average?) 1,124kg. (Over 1 metric ton) of feed, per cage, per day. (Each cage also has 16,000 lumpfish for control purposes and harvest.) In total, the Proponent plans to raise 7 million smolt to marketable fish, each year, and produce 33,000 metric tons of products in these locales. There is nothing to stop it grossly exceeding that amount, with all the impacts magnified.
- viii. Petit Forte is mentioned as a crew transit port but no detail whether it would have an on site location or even involve a local person to tie or moor vessels.

Therefore, Inner Placentia Bay and contiguous areas should have their environment and precious Channels considered for protection for present and future usages. The people and communities thereto should be principal beneficiaries and maximize benefits in the utilization of their environment, and these determinations be more fully accounted for in an Environmental Impact Statement.

V. Affected Area

- i. Although the Proponent has (undisclosed) exclusive rights to Placentia Bay for sea cage salmon aquaculture, it now lays claim in its literature to vast sections of the entire Bay. It is a proverbial case of give someone an inch, and they claim a foot.
- ii. The Proponent repeatedly refers to the Project as a Burin Peninsula project.
- iii. The often stated benefits of this 'new' industry are to accrue to an ill-defined area on the Burin Peninsula, although it is clear that the major beneficiaries are the communities and people of the southeastern peninsula where the administration, hatchery and anticipated spin-off tourism related to it, and processing, are to take place.
- iv. The determination over how much area of Placentia Bay the Proponent will ultimately control is not clear; indeed, it is unnecessarily ambiguous.
- v. The boundaries to each Management Area are said by the Proponent to be 'imaginary'.
- vi. The maps showing the management areas are far more encompassing than +/- 200ha of each of the 11 proposed licensed sites, even when collectively amassed into one management area.
- vii. Collectively, the total area of all four management areas could be rights to an excess of 2,000 square kilometers to exclude and/or veto any other development or future usage.
- viii. The Proponent presents a broad circular overlay on its Location Map (examples: Volume 2, Appendix Y and Registration, Part 2, Figure 13, page 47) for its fish farming region, and in it the Proponent repeatedly lays claim to Inner Placentia Bay, the Western and Central Channels, adjacent banks to the south, the Rushoon archipelago, much of south central Placentia Bay, and all of the eastern shore passed Ship Cove. In total, it is well in excess of half of Placentia Bay. (Interestingly, Figure 4.4, 'Locations of major fisheries in Placentia Bay, based on community-based coastal resource inventories', has a similar jurisdiction.)
- ix. Each management area will operate as a separate corporate entity, but that entity is not proclaimed. The responsibilities, liabilities, access and ownership, and related matters are not

identified. The Proponent claims an internal management rationale, but the devil is in the details, which are not forthcoming.

- x. The vessel operation in the affected areas is substantial, consisting of, but not limited to, 3 feed/accommodation barges (44m), 6 satellite barges (28m), 3 service vessels (25m), 3 work boats, 3 crew vessels, and 8 other vessels of third party suppliers – some quite massive.

Therefore, each company for a management area should incorporate an EIS. It would include both the licensed area for each site, the combination of sites in an area, and contiguous area, up to and including the 'imaginary' boundary, and beyond if need be to identify effects, and rights and responsibilities, thereto. Additionally, the Proponent cease, in writing, laying claim outside any leased sea cage area.

VI. Rationale & Funding

- i. Food security and supply are amongst the Proponent's stated goals (e.g., Volume 2, Appendix Y), but rationale and the economics is never presented for Newfoundland and Labrador.
- ii. Supporting documentation for any purported food shortage and availability is missing.
- iii. The operational objective of a plan for international markets is only briefly referenced, with no detail; i.e., international markets capture our environment, with unstated and limited returns.
- iv. The actual, factual, economic benefits for Newfoundland and Labrador are never detailed and quantified. There is no statement of royalty regime, tax structure, licensing fees, or even a local portion of any long-term operating surplus.
- v. The Project states it will provide an unidentified profit to foreign shareholders.
- vi. No cost-benefit analysis and no Proponent contribution or investment is detailed.
- vii. A climate change plan for reduction of carbon and greenhouse gas emissions is not detailed.
- viii. No mention or accounting for provincial government funding of \$250 million is presented in the EIS (although \$300 million is briefly mentioned in the earlier Registration document). Provincial government officials know the details but the public should have an accounting.
- ix. Employment for the sea cages is listed at 137 positions, half of which are labourers and deck hands; the remaining are technicians, captains, managers and positions that may not involve an actual presence on site. A week on/off rotation is proposed. With respect to the people of Inner Placentia Bay, no local employment preference policy is ascertained, other than possibly the Burin Peninsula, but that is not assured with a rotational system. Baine Harbour is unsure.
- x. A five percent population decline in the area is also given as rationale.

Therefore, the Proponent expands its stated objectives with rationale and quantifiable data. A full accounting debriefing and cost benefit analysis be presented on actual funding and financial benefits, investment, cash flow projections, and return to Newfoundland and Labrador on government investments, licensing, and marine areas. Employment benefits to Inner Placentia Bay are highlighted.

2. Alternative(s)

- i. The EIS Guidelines clearly call for alternatives to the Project.
- ii. An analysis of alternatives to the undertaking should satisfy the need for the project.
- iii. Explanations are required for rejecting other alternatives.

- iv. Environmental and social costs and benefits of alternatives are to be presented.

The discussion on alternatives is limited in the EIS. Three alternatives are assessed and dismissed, cursorily. The under-reported rationale of enormous demand for farmed salmon and the company's goal to provide high quality product for the North American market has no data upon which to contrast the output of any viable alternative. The only realistic alternative for the Proponent is NO PROJECT, no benefits, and no environmental effects. It is rather arrogantly put forward, knowing full well that their original perceptions are likely not so grand a project (e.g., Burgeo); and, evolving attitudes and concerns nationally and internationally increasingly make alternate aquaculture practices an imperative.

The Proponent dismisses three alternatives, as follows:

- 1) Operating on the west coast in the Bay St. George area, which somehow mysteriously is discounted because it is not close enough to the St. John's airport, although it has an airport of its own and it is closer to the North American market, via the Gulf. (The processing plant in St. Lawrence would be a +/- five hour road trip to St. John's airport.)
- 2) It admits that on-land presents the opportunity to operate with new and emerging technology, yet the size and scope of the envisaged Project of 33,000mt in Placentia Bay has yet to be proven economically and technically viable. Such a project would have important fiscal challenges, and greatly increase the carbon footprint, possibly two-fold. On the plus side it would minimize fish escapees, predator interaction, reduce disease transmission, lower feed inputs, have high stocking densities, and improve waste management. The cost is estimated to increase by 2.5 times, and such a project would need to be closer to market to be viable.
- 3) A conventional technology project, similar to those on the Connaigre peninsula with a standard diploid organism, possibly from the St. John, New Brunswick stock, is opposed to the European (Icelandic) triploid strain they wish to import. Such an alternative is a non-starter for them. They are simply not interested in what they view as an inferior technology.

The Burgeo area mentioned in the Registration Undertaking is never re-assessed as an alternative. Fortune Bay is not considered.

Three more evident under-reported or unreported alternatives fall under purvey of how big is too big. The first is a full, more honest assessment of land-based aquaculture.

- 1) **Land-based:** Increasing international attention is drawn to land-based aquaculture; after all, it is farming and husbandry by another name. Concern and opposition to marine aquaculture abounds and is increasing in intensity. Does the provincial government wish to support an approach to food security that down the road will be a pariah in international markets? Despite the obvious stated advantages of on-land operations, the constraints are reported to be financial and technical for the size and scope of the envisaged Project of 33,000mt. Apparently, on-land operations are a way of the future, and allow for the full privatization of the costs, especially on the environment. International leadership on aquaculture is heading in that direction as communities, countries and people want less destructive environmental footprints in food production. Freshwater resources are available on land, and their use for large scale

and even irreversible development purposes has been sanctioned, as in Long Harbour at the nickel processing plant for its effluent, much to the chagrin of environmentalists. As the EIS process fails to present the economics of the company's ambitions and how realistic their production targets may be, it can reasonably be assumed that a less ambitious and less aggressive alternative could be made attractive to address the current technological constraints and also interest investors, particularly the provincial government, which would support long-term sustainable innovation in aquaculture. Coupled with greater density for on-land operations, and a more realistic on-land operation of +/-16,500 metric tons, the number of sites would be considerably reduced, innovation would take hold, and the company could grow into a larger operation. A 20,000 ton land-based project has been under development in Florø, Norway, and attests to the latest water recirculation technology and treatment. The technology means no dams; it ensures full control of water quality and optimal fish health and welfare, and a healthy environment. Sea cage operations will go wrong, so it's time to look at alternatives, and the Proponent should outline the current concepts and possibilities of on-land production, the technological opportunity and the societal circumstances; the economics; and, how the new approach and technology advance the position and competitiveness of the Newfoundland and Labrador's aquaculture industry. Basically, the Norwegians are re-assessing their leadership role of where salmon farming is going in the future, and nothing less should be expected from this Project. Alternate investment scenarios could be presented to make this work. Wouldn't it be better to get on the right track from the start, instead of being a race to the bottom of environmental stewardship and new international standards?

- 2) **Southeast Burin Peninsula:** The Proponent reiterates this is a Burin Peninsula project. Then, that is where it should place its sea cages. The most responsible alternative for sea cage aquaculture would be the Marystown to St. Lawrence area, where a more realistic initial plan of +/- 50% of the envisaged 33,000mt production would let the Project grow over time as it proves itself. It associates the environmental costs with the area that will maximize the economic benefits. It satisfies the Proponent's requirements for fish rearing: deep water, shelter, good circulation and tidal flow, located away from community or industrial effluent, away from large vessel traffic, and minimizes interference with an existing established fishery. It protects the broad swathe of the sensitive ecosystem of Inner Placentia Bay and adjacent environs from the encroaching large scale industrial development of this Project. The effects on wild salmon, the Placentia Bay cod stock, the entire benthic environment, and so much more, would be radically reduced; e.g., few very low yield salmon rivers are in the southeast area. The optics would be good as the vast majority of the total company employment will be in this area, and they wouldn't be polluting, at any cost to themselves, a pristine area further in the Bay. The economics should resonate favourably because all operations would be near-at-hand: the central administration in Marystown, the hatchery, the processing at St. Lawrence, the transit points, and the sea cages. Investment would be substantially reduced. This alternative to the Project would be more attractive both environmentally and financially.
- 3) **Placentia Bay:** A smaller initial Project, or the gradual phase-in, of sea cages is probably the least desirable alternative, as it still is environmentally destructive. It should proceed with the utmost of caution. It would see the imposition of a limited number of sea cage sites, conceivably with better baseline information of *one* particular management area (e.g., Long Harbour). Assessment of effects and benchmarks at various stages would be easier to handle.

The benthic environment would be less impacted initially, and people and government would gradually get to see the Project's true colours. Nonetheless, it would still have to prove itself in terms of maximizing benefits for the surrounding communities of Inner Placentia Bay and congruent areas, be of benign environmental impact, and of course be a sound investment.

Therefore, alternative projects incorporating more realistic initial production and a more positive environmental footprint exist. A land-based alternative deserves the more extensive elaboration and investigation bearing in mind greater technology transfer, being current with international trends, and addresses the blow-back on sea-cage aquaculture. Initial smaller sea cage alternate sites (e.g., the southeastern Burin Peninsula) would still necessitate prudent, preemptive action on impact variables regarding fish habitat and the benthic ecosystem, fish (notably cod and salmon), and economic components. These actions provide foresight for environmental stewardship as the company grows.

3. Fish Habitat & Fish Impacted

Fish habitat and fish impacted presents the negative effects of the Project on three aspects: the fish environment (or benthic habitat), cod, and salmon in Placentia Bay.

Fish Habitat: The benthic environment (fish, eggs and larvae, seabed, mammals, fisheries) is seriously effected by the Proponent's proposed activities.

- i. The Project will consume a considerable area and the Proponent admits to unquantifiable loss of benthic habitat of plants and animals, including those upon or within (infaunal) the seabed sediment, and generally understates or ignores critical impacts.
- ii. These losses include negative effects on the health of benthic plants, animals and fish; likely loss of threatened, rare and endangered species through development and operations; reduction in species diversity through species loss and disruption of food webs; loss of critical predator habitat; transformation of natural landscape; substances toxically effected on wildlife, augmented in consumption; reduction in the capacity of renewable resources for the needs of present and future aquatic generations in the benthos; loss of crucial use of the environment and resources for traditional purposes; and, reduction of commercial fisheries resources.
- iii. The determination of specific losses (in .ii) for the currently envisaged Project should address environmental effects on the benthic environment including, but not limited to:
 - a. Placentia Bay is designated an Ecologically and Biologically Significant Area (EBSA). Figure 4.13 presents important overlapping areas of ichthyoplankton, mammals and seabirds.
 - b. The sensitive area designation, EBSA, is based on uniqueness, aggregation and fitness consequences, and secondarily on resilience and naturalness - all requiring elaboration.
 - c. Western and northern Placentia Bay has the highest concentrations of early-stage eggs of Atlantic cod, anywhere. Concentrations for other species are in the Study Area. The pelagic eggs and early larvae are distributed with passive drifting. The distributions of older larvae are congruent with the area of high biological production. The spatial

distribution of pelagic larvae is increasingly determined by their behaviour and ability to swim as they develop.

- d. Uniqueness features include: high biomass of marine mammals and sea turtles, Northwest Atlantic Ocean's *largest* cod spawning stock, a barely surviving recreational salmon stock, other notable species, four important bird areas, and stable water temperature and salinity although some contamination and disruption is evident with increased commercial and industrial activity, and will be evident with this Project. (The Proponent does not quantify, and barely acknowledges, more industrial disruption with the proposed Project.)
- e. Eelgrass provides a crucial habitat and important nursery that has been over-run with the invasive green crab. (The invasive green crab burrows the eelgrass root system and destroys it.) Eelgrass reduces local currents, provides protection from predators, stabilizes the sediment, filters water and increases habitat complexity. In addition to various non-obligate algal species that are associated with eelgrass, there are at least 20 obligate algal species that are dependent on eelgrass for the completion of their life cycles. A reclamation project is underway (as noted at the end of the following section).
- f. Capelin is the most ecologically important fish species. It is important to fish, birds and mammals. Its abundance and distribution in Placentia Bay is south of Merasheen and Red Islands, Paradise Sound and the head of the Bay. It is crucial that it exist.
- g. Each site is a sink for tons of contaminant and their endocrine dissipation.
- h. The food chain dynamic.
- i. Water temperature increase at and adjacent to the cage sites; its effectual dissipation.
- j. Habitat alienation.
- k. Distinct infaunal communities which abound in Placentia Bay.
- l. Sentiment in Inner Placentia Bay is characterized by a high percentage of clay, carbon and nitrogen, and how they will be impacted, despite the claim that all cages are over hard bottom. (Contaminants then spread more easily to surrounding habitat.)
- m. Phytoplankton, zooplankton and eggs and larvae of fishes and invertebrates are in abundance, free flowing, and form the basis of the marine food web, but are treated as inconsequential.
- n. Other impacts of critical activities include a missing mortality assessment of species.
- o. The loss of habitat by the Project is not quantified, nor the effects of the Project on the survival of floating or migrating eggs and larvae of cod, herring and other species drifting through the zone(s) of impact.
- p. The migrating routes of various species, particularly wild salmon are unknown. Nothing has been done or proposed by the Proponent to improve that knowledge base, or the migratory routes. Willful ignorance places sea cages wherever they want.
- q. Important commercial species for lobster, snow crab and scallops are at or near the proposed sea cage sites. Other fish species in the vicinity of the sea cages include cod, herring, sea-run brown trout, lumpfish and capelin. Collectively, they all are in jeopardy.
- r. Top predators like sharks including endangered ones (e.g., 'Lydia' in 2013), Bluefin tuna, whales and seals abound in recent years, with a marked increase of sharks and tuna, with the certainty scenario of attempts at sea cage penetration. Lethal force is the Proponent's default option, and should not be tolerated.

- s. The avifauna of Placentia Bay is reliant on the existing healthy ecosystem.
- t. Herring is heavily aggregate around the islands of Inner Placentia Bay, particularly Merasheen and Long Islands, and are harvested some distance away.
- u. Modelled footprints of the disposition of organic matter in the vicinity of the proposed sea cage sites show a larger effect than a proposed license. The dispersal will be by current (out of sight, out of mind). Cleaning of sea cages of nitrogen and phosphorous will depend on current dispersal, and add to the load of organic material dispersed. But, where does it all go?
- v. The EIS states the primary negative effect on fish and fish habitat is accumulation of organic waste on the seabed, below and adjacent to the sea cages. The Proponent claims it potentially causes chemical, physical and biological changes to the sediment. Little evidence suggests transfer of diseases or parasites from farm fish to wild fish, although the new breed of triploid salmon is untested and may in actual fact do that.
- w. The effects on fish and fish habitat, species at risk, and sensitive areas are predicted to be *not significant*.

Therefore, the critical benthic factors in themselves should be sufficient to deter Project sanction of the proposed sea cage sites in Inner Placentia Bay, as presently conceived. The factors should be addressed, more comprehensively, and given foresight. For the most part, they would not have to be incorporated into planning for an alternative land-based project.

Cod: Atlantic cod historically is the leading food fishery in the world. In Newfoundland and Labrador it is the single most important commercial species until recently. Atlantic cod in Placentia Bay constitute a *special concern* statement under the Species at Risk Act (SARA), and listed as endangered under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Specific impacts include, but are not limited to:

- i. The current status of cod stocks in Placentia Bay are difficult to ascertain. A commercial (3Ps is now the only one in the province), a sentinel, and full recreational fishery do occur.
- ii. Scientific evidence suggests the existence of a specific Placentia Bay coastal cod stock, which is now more abundant inshore, than offshore, and on the verge of being threatened.
- iii. Cod eggs are most abundant on the west side of Inner Placentia Bay, especially Bar Haven, which is just north of the proposed Merasheen management area.
- iv. Cod and capelin larvae are more abundant in Western Placentia Bay and southern Merasheen and Red Islands – former fabled fishing grounds.
- v. Identified spawning locations are Bar Haven and the Oderin Bank. Swimming ability and behaviour become increasingly important. Algal biomass is typically higher in these areas and provides greater food for hatching larvae.
- vi. Substantial inshore cod spawning consistently occurs.
- vii. Cod feeds mainly on zooplankton, and then switches to benthic and other invertebrates.
- viii. Juvenile cod are surveyed at numerous shallow shoreline locations throughout Placentia Bay. Great Brule and Bar Haven represent critical habitat.
- ix. 10-30% moves to adjacent 3L stock, with a return migration.

- x. Based on commercial fishing data, Atlantic cod are harvested commercially in areas proximate to Oderin Bank and proposed Rushoon, Ship Harbour and Merasheen management areas.
- xi. The destruction of the cod stock in Placentia Bay apparently would gain unconscionable acceptance with some fishers if they gain compensation in the form of access to stock in other DFO Divisions or access to the South Coast or St. Pierre allotments for Division 3Ps.
- xii. Overall, the Proponent gives a light brushing in its account of cod. It's just another fish. The Proponent doesn't address it specifically to a determination of significance and the degree of certainty of that prediction. From the previous section on fish and fish habitat, it is assumed the Proponent considers such effects as *not significant* for cod, despite evidence to the contrary.

Therefore, the Project will be the death knell for the cod stock of Inner Placentia Bay, its spawning grounds off the Western Channel, and its migration through the Western and Central Channels.

Wild Salmon: Wild Atlantic salmon in Placentia Bay have been an important historical component of early aboriginal life and since the earliest records of European fisheries. They are designated by DFO for recreational angling purposes as SFA 10 - part of the South Newfoundland Atlantic Salmon Designated Unit 9-12. They are fished commercially until 1992. Specific impacts include, but are not limited to:

- i. Wild salmon exhibit a significant net decline in abundance of mature individuals. (The bigger the salmon the more abundant the spawn.)
- ii. Limited information exists specific to wild salmon in Placentia Bay; e.g., migration routes, time and activities within the Bay, and ecological interaction.
- iii. COSEWIC lists wild salmon as *threatened* in 2010, and likely to become *endangered* if limited factors are not reversed. Those factors have increased since.
- iv. They are not listed as such under SARA.
- v. A low probability of recovery (<30%) is estimated within 15 years (2013). No additional recovery activities have been taken (2017).
- vi. Placentia Bay has 20 scheduled salmon rivers and at least four non-scheduled salmon runs.
- vii. Data on the status of mature wild salmon in Placentia Bay is between a low of 2,828 and a high of 5,099 (DFO 2017). The Proponent uses the high number of 5,099. The stock is down from 21,866-29711 (COSEWIC 2007), a decline in 10 years of as much as 90%. Angling statistics are a little more optimistic. During 2012-16, 10,980 wild salmon are caught, of which 4,429 are retained. Anglers estimate the range in the neighbourhood of 4,981-9,388. Still, it is a +/- 70% decrease if contrasted with COSEWIC 2007, as baseline data.
- viii. DFO's recent genetic analysis of juvenile salmon from Fortune Bay and Bay d'Espoir indicate 35% of all juvenile are now either farmed salmon or first and second generation hybrids. Some hybrids are capable of reproducing.
- ix. A greater risk of genetic and ecological effects (genetic drift) from farmed salmon escapements threatens or put the wild salmon population at risk.
- x. Breeding farmed and wild salmon potentially causes negative impacts on character, abundance, and survivability of wild stock, in particular radically altering fitness and ability to adapt to environmental conditions.

- xi. The Proponent will monitor updates and comply with 'relevant' regulations pertaining to species at risk. However, it only profiles species as endangered, threatened, special concern or vulnerable under Schedule 1 of SARA, and not COSEWIC, which does list wild salmon.
- xii. The Proponent acknowledges during seasonal migrations of wild salmon the Project activities will negatively interact with wild salmon with high frequency during feeding of farmed salmon and the wild salmon's general attraction to sea cages (e.g., lights, spilled food). Less frequency is projected for therapeutic and antibiotic interaction. High frequency will occur with wild salmon's interaction with organic material on the seabed, and subsequent contamination. The residual effects on wild salmon are made to be high.
- xiii. Wild salmon migratory corridors in Placentia Bay have not been identified. The Proponent claims the majority of salmon rivers are more than 20kms from proposed sea cage sites, but wild salmon have to migrate near or passed the management areas to access over half the salmon rivers, and the most prolific ones at that, in Inner Placentia Bay.
- xiv. Free-living stages of salmon sea lice can disperse to a distance of tens of kilometers, and lead to an increase in mortality in both farmed and wild salmon. Triploid farm salmon, potentially, can cause increased disease transmission to wild salmon, including the seriously infectious salmon anemia (ISA), which requires federal reporting (CFIA). Feeding of farmed salmon will continue for as long as 18 months, per pre-production operating cycle.
- xv. European origin (Iceland sourced) triploid salmon has never been utilized in Newfoundland.
- xvi. Escapees are considered a frequent and inevitable occurrence. Genetic techniques to trace farm salmon in the wild from the originating farm would make operators accountable for unreported escapees (in the Proponent's case the specific company established for each area).
- xvii. Freshwater habit is the most important factor influencing wild salmon population genetic structure. Small depressed stocks are more vulnerable to impacts of genetic drift.
- xviii. Key aspects for compatibility for food and space between escaped farm salmon and wild salmon are how escaped salmon are distributed and how long wild salmon remain in Placentia Bay during migration between rivers and feeding areas in the offshore marine environment – an environment which presently is the most critical factor in their survival.
- xix. The Proponent claims an escape scenario (e.g., one sea cage in the Rushoon area) of 160,000 farmed salmon and 16,000 lumpfish is predicted to be *not significant*, over a geographical extent of 1,000 to 10,000 square kilometers, with a *medium* level of confidence. It continues, disingenuously, to expand the same prediction for all two million farm salmon from all 12 Rushoon area cages. The scenario is for an immediate area with three or four salmon rivers, it is *adjacent* to the Oderin Bank where the cod spawn and where cod eggs and larvae exist and float about, and it sees little impact in the immediate area, let alone an extended area. Incredulous!
- xx. The Proponent predicts primary negative effects on wild salmon are potential for transfer of disease and parasites. The effects, it claims, are minor, localized, and relatively short-term.

Therefore, the Project will contribute significantly to the premature demise of wild salmon in Placentia Bay. Amongst other faults the Proponent disclaims any moral or ethical responsibility to the wild salmon it strives to emulate and use as its brand, and it presents no proactive measures to foster and enhance wild salmon or their habitat in Placentia Bay. No camera or ROV findings are made available to form subsea database information, especially to contrast for periodic evaluation of environmental effects or decommissioning. It does not commit to genetic markers as accountability for escapees.

Furthermore, the survival of wild salmon in the marine environment and freshwater habitat is accepted as crucial for their existence. The Proponent could initiate support for mitigation, inaugurate research, monitor and provoke better management so as to preserve the economic, cultural, social significance of wild Atlantic salmon, as per the demands of the province's Guidelines for the EIS. Yet it says nothing. The Proponent could address two major impediments for Atlantic wild salmon, even with token support, if they have the fate of wild salmon at heart, namely: Firstly, the petroleum frontier of the northwest Atlantic provides crucial habitat and migratory routes. It is subject to immense, destructive seismic activity (+/- 3 million kilometers in the past 50 years, with a recent increased concentration toward Greenland at and on the vital salmon migratory Bonavista corridor). Secondly, Paradise River at Paradise Sound has a huge hydro dam since the 1980s, with no salmon ladder. Granted, support to address the impediments could be more than philanthropic, but they would be welcome, nonetheless.

4. Valued Economic Components Impacted

Valued economic components impacted include commercial fisheries. The components illustrate benefits maximized mostly for southeast Burin Peninsula with little benefit to Inner Placentia Bay and contiguous areas. The components impacted are, but not limited to:

- i. The commercial fisheries have undergone considerable change over the past five decades.
- ii. NAFO Division 3Ps includes Placentia Bay, Fortune Bay, the central portion of the South Coast, and St. Pierre & Miquelon. During 2010-2016, the commercial fish harvest is dominated by Atlantic cod (26%), snow crab (21%) and whelks (15%). The harvest of other species includes Atlantic herring (7%), American lobster (4%), and sea scallops (4%). Newfoundland vessels account for 87%, St. Pierre & Miquelon 8%, and the Maritimes 5%. Cod has increased in importance since a limited cod fishery is reinstated in 3Ps and Placentia Bay in 1997, and is the only remaining commercial cod fishery in the province. During 2016, the commercial fishery is dominated by Atlantic cod (34%), snow crab 8%), herring (7%), and Atlantic lobster (7%).
- iii. DFO has instituted an evolving fish harvesting rationalization strategy, which includes bycatch regulations. There is a spatial overlap between the Study Area and research surveys in 3Ps.
- iv. The inshore fleet has exclusive access to the 3Ps cod stock once that quota decreases below 10,000mt – the DFO catch allocation of recent years, which is shared amongst the respective bays, south coast, and the French islands.
- v. The total landed cod for 2015-16 in 3Ps is about 48% of Total Allowable Catch (TAC) or, 6,427mt. The TAC for 2017-18 is 6,500mt, bringing it in line with harvest rates. The loss of markets for cod in recent years is a big factor in the reduced catch over recent years. The Proponent has its own opinion and relates the reduced catch to high mortality levels that will likely sharply decline the biomass in future years, but says nothing about the likely impact of its own activities on that same biomass, in future.
- vi. The allocation of the TAC for 3Ps for Placentia Bay in 2017-18 of 1,505mt (<35') and 571mt (35-64'). As of near the close of the season in February 2018, the TAC is exceeded with 2,172mt and 875mt, which probably approximates catch rates of recent years for Placentia Bay.
- vii. Commercial fish harvesting (notably cod, snow crab and lobster, but other species as well) occurs throughout Inner Placentia Bay and in areas adjacent and near proposed sea cage sites. Locations vary over time with species migration. The distribution of 3Ps cod does not conform

- well to management boundaries, and it is considered a complex mixture of inshore and offshore sub-components, with seasonal migrations.
- viii. The vast majority of catch weight is by the inshore, fixed gear fleet. (There is some discrepancy with the statement of harvesters using traps, where traps haven't been used in years.) Harvesting is mainly gill net and hand-line.
 - ix. Harvesting occurs year-round. There is a closure during cod spawning in the Winter/early Spring for all vessel classes in northwestern Placentia Bay, and along other areas of 3Ps at various times to protect cod spawning aggregations. The closure for snow crab is August-September, or when a high incidence of soft shell occurs. Catch rates for snow crab, including the proposed Rushoon management area, are declining. Closure occurs once TAC is realized.
 - x. Vessel registrations for Inner Placentia Bay include 339 (<35') and 77 (>35'), or approximately 420. Commercial fisheries in Placentia Bay is prosecuted using primarily small vessels <45'. No vessels are listed >45' in the EIS.
 - xi. Including vessel crew members, there are currently 1,500 harvesters in 3Ps. (Proportionally estimated at 625 for Placentia Bay based on .4165% allotted of historical catch for the Division.)
 - xii. Seven licensed fish processors operate in Placentia Bay, mainly on the eastern shore. Only two processors around Long Harbour are near sea cage sites. Fish harvesters in Inner Placentia Bay mostly land their catch and truck it to nearby fish plants, accessible by road.
 - xiii. Potential fisheries of underutilized species exist, as evident from multi-species trawl surveys, although these surveys generally reflect predominate species caught in southern and outer Placentia Bay.
 - xiv. Figures are available for 2010 for the commercial value of all species caught in Placentia Bay. It is estimated at approximately \$10 million, for 6,700mt, primarily snow crab and cod. Lobster represents only 1% of catch weight but 4% of value, at about \$1 million. By contrast, the sea cages will produce at peak production approximately 33,000mt of live weight salmon, hatched in Marystown, and processed in St. Lawrence.
 - xv. Four principal marine species are used in aquaculture: Atlantic salmon, blue mussels, steelhead trout and Atlantic cod. As of 2015, only four shellfish aquaculture sites for blue mussels and oysters are in Placentia Bay – two along north Merasheen Island and two at Long Harbour. All previous cod farms have discontinued. Because of water temperature, current salmonid aquaculture operations are confined to the south coast of Newfoundland on the Connaigre Peninsula. None presently operate in Placentia Bay.
 - xvi. Recreational fishery (wild salmon): The recreational wild salmon fishery for the 20 scheduled rivers in Placentia Bay (SFA 10) runs from June 1 to September 7. Salmon returns for 2010-2016 average 1,074 retained and 1,437 released, for a total of 2,511. Salmon fishing in all salmon rivers is restricted in 2017, and a limit to one salmon retained is set for 2018. A license is required. Large salmon (>63cm) are not to be retained. (Information is unclear, but it may represent upwards to 500 salmon anglers on the scheduled rivers of Placentia Bay.)
 - xvii. No detail is provided on economic impacts of wild salmon recreational angling, although anglers purport a substantial economic impact for local businesses, tour operators, guides and services.
 - xviii. Recreational fishery (cod): The groundfish recreational fishery occurs during the summer and early fall, at five groundfish per day, per person, to a limit of 15 per vessel. Data is dated to 2007, at which time on the Burin-South Coast area approximately 5,380 'anglers' catch a total of 93,450 cod. This fishery is still heavily prosecuted.

- xix. Recreational fishery (other): Data is limited or unavailable for other species like brook, brown and rainbow trout (which anecdotally have many fishers), recreational scallop fishery, landlocked salmon and a few other species.
- xx. Six indigenous groups hold commercial fishing licenses applicable to Placentia Bay. They are primarily unused. The Miawpukek First Nation (Conne River) holds a Food, Social or Ceremonial salmon fishing license but has not harvested wild salmon since 1997.
- xxi. A sentinel inshore fishery occurs in Red Harbour, adjacent to the Rushoon management area.
- xxii. The Proponent offers an incomplete and selective list of Tourist Attractions, concentrating on the southern Burin Peninsula and Fortune Bay. Eastern Placentia Bay is excluded.
- xxiii. The Proponent reports anecdotal lifestyle information, as noted above, of 400 cabins throughout Placentia Bay (some would find that number to be low). It reports an increase in pleasure boating with 200 recreational boaters on the water on any given day in summer.
- xxiv. The physical landscape allows for greater eco-tourism.
- xxv. All aspects of the Project are within the Vessel Traffic Service area of Placentia Bay. The area is designated a high traffic zone, with Canadian Coast Guard facilities at Placentia/Argentia.
- xxvi. In co-operation with the Marine Institute, DFO is restoring eelgrass in Inner and western Placentia Bay in areas adjacent to the proposed management areas. Coastal restoration of the vital eelgrass is underway at nine sites in Placentia Bay, with 10 fishers per site harvesting the destructive and invasive green crab. A large freezer terminal at Argentia accepts donated crab.

Therefore, substantial pluralistic economic activities, and concomitant social interface, occur currently throughout Placentia Bay, specifically Inner Placentia Bay and environs. It is not a *tableau blanc*, but a complex, fragile, integrated economic environment.

5. Effects: Residual and Cumulative

Considerable economic use is made of the waters of Placentia Bay. The entire Bay is characterized as an Ecologically and Biologically Significant Area (EBSA). The Proponent's Project is new. Based on the foregoing discussion, the residual effects deal with the Project and its effect on the environment. Cumulative effects deal with those residual effects accumulating with other projects in Placentia Bay.

Residual effects: The Proponent admits the annual closure of areas to protect cod spawning grounds is partially within the northwestern portion of the Merasheen BMA. It is also ~2km north of the Ship Harbour proposed sea cage site. The management area crosses access to cod and crab grounds in the Rushoon BMA. The Proponent claims to locate sea cages 20kms from sensitive areas, salmon rivers and eelgrass restoration, but the concerns about potential effects on sensitive areas, wild salmon, cod and cod spawning areas, floatings and migrations thereto, remain. An effect on the eelgrass project is suspect in the long-term. The Proponent says nothing about its effect on cod in the future. Yet, it claims that the residual effects of Project activities to be *not significant* with a *medium to high* level of confidence for fish and fish habitat, wild salmon, species at risk, and sensitive areas.

The Project will be develop *and* perish for cod, salmon, and lesser known but potentially greater impacted threatened and endangered marine species. It is impossible to have such a sizeable undertaking in such a sensitive biological and environmental area without substantial negative impacts.

The Proponent's primary mitigation measure is *avoidance* in future operation activities. It may partially negate the initial impact of its very substantial presence, immediately and irreversibly, by more foresight and proactive measures, which unfortunately are in short supply. They can only negate it fully by avoiding the Project, altogether.

The Proponent can justify a positive, tangible socio-economic effect through employment, training, and new business opportunities associated with a new industry, and greater use of recreation and tourism facilities for the Burin Peninsula, primarily around its own onshore bases of operation in the southeastern part of the peninsula. It considers effects on demographics and the economy to be a significant positive contribution to the area and the province.

The Proponent cannot justifiably lay claim to a positive impact with respect to either the fisheries or fish and fish habitat, and sensitive areas, for Inner Placentia Bay. It will be devastated, and the unfortunate part is that so little baseline data exists of what will be lost, with initial construction and Project implementation, let alone future operations.

The potential for some baseline information on sensitive areas, fish and fish habitat, and current overall environmental quality exists with the Proponent's undersea telemetry and Remote Operating Vehicle (ROV) activities, but that information apparently is unavailable or not accessible to anyone outside the company. It would only constitute a partial base, nonetheless. A full baseline regime overseen by the relevant government authorities is necessitated for ongoing analysis of effects and the full residual effects at decommissioning.

The Proponent does commit itself to follow-up monitoring to identify unforeseen negative effects. To complement its avoidance strategy, it commits to an *adaptive* management approach to address environmental issues; i.e., mitigation measures will be implemented as the company warrants.

Cumulative Effects: The assessment of cumulative effects on the biophysical and social-economic value components of the Project with current and proposed developments in Placentia Bay is predicted to have *no significant* cumulative effects. A general lack of spatial overlap amongst projects limits potential cumulative effects. The level of confidence again in its prediction is *medium* to *high*. (The EIS is based on earlier and additional information and similar determinations in NLRC and INCO/VALE's EISs.)

How much impact is too much? It's unknown for most species or even thresholds for commercial ones. Ecosystems cannot always cope with the combined effects of human activities without fundamental, functional or structural change. Their potential effects have to be considered at the outset, and monitored throughout the life of a project. They need to be holistic, with a tiered approach from each site to areas, to the range of the Proponent's activities, integrated with existing and evolving processes.

Factors that should be considered for cumulative effects monitoring include, but are not limited to: contaminant loading (change to water quality, sediment, air), and direct habitat change (sediment disposition, disturbances, natural events, habitat alienation and fragmentation, and direct mortalities).

Some cumulative effects unaddressed include the Project's contribution to the decline in water quality, decline in the health of the ecosystem, loss of migrating areas and species, and physical and cultural heritage (e.g., close of commercial and recreational fishing areas). They should be address with respect to magnitude, geographical extent, duration and fragmentation, irreversibility and ecological context.

Cumulative effects, like residual effects, require good baseline data to make future determinations. Properly orchestrated, documented, underwater telemetry concomitant with a science program of updated biological and ecological information contributes to that baseline and allows for new evidence.

Residual and cumulative effects: COSEWIC and the SARA are instruments that aim to prevent aquatic species and habitat from becoming extinct in Canada. They provide for the recovery of marine life that are extirpated, endangered or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened. A threatened species or one of special concern is one likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. Wild salmon and cod, and the sensitive benthic ecosystem, in Placentia Bay fit these determinations.

Everyone involved in this Project must contribute to protect the sensitive marine environment of Inner Placentia Bay and adjacent areas through cooperation, consultation, stewardship, and ongoing review. Good common sense, empathy, and proactive measures also help. The Proponent's *modus operandi* of avoidance and adaption after the fact is extremely shortsighted. A proactive approach is warranted.

The repeated determination of insignificant effects in the Proponent's EIS is the height of arrogance. It is mere rote formula of filling in the blanks. It is disrespect for the EIS process to state or even suggest that the effects will be low to minimal, and the assurance is repeatedly high for that prediction, with so much evidence to the contrary, including accumulated evidence even in the Proponent's EIS.

Interestingly, the Proponent does not have the level of confidence to guarantee its claim of no residual or cumulative effects by an indemnity. Despite the claims in its assessment, it should know the effects of the Project will include, but are not limited to, the following:

- Negative effects on the health of the biota, including plants, mammals, and fish.
- Threat or loss to special concern, threatened, rare, and endangered species.
- Loss of, or damage to, critical habitat, including habitat fragmentation.
- Discharge of chemicals and agents.
- Population decline, especially of larger and long-lived species and members of species, like older salmon and cod, which produce the most spawn.
- Reduction in the capacity of renewable natural resources to meet the needs of present and future generations.
- The transformation of the natural ecosystem and seascapes.
- Obstruction of migration and passages for various fish species, or willful ignorance that they exist in the management areas.
- Negative effects on the quality and quantity of the biophysical environment.

Information for environmental effects monitoring should be cumulative and integrated into resource management decisions and future impact predictions. It should have an accountability framework and measure progress, relevance and effectiveness. Aquaculture in Inner Placentia Bay should operate on the precautionary principle, err on the side of caution, re-affirm a commitment to a wide application of the precautionary approach in conservation, management, and protect and preserve the exploitation of the marine environment. The Proponent may state it doing so, but the proof is not there in the EIS.

Aquaculture in Placentia Bay should be developed in a manner that supports public confidence and industry competitiveness, *writ large*, in the broadest international context, cognizant of emerging trends and leading-edge technology, in particular land-based aquaculture. It should not be at the irreversible expense of marine species their habitat, and the race to the bottom for the benefit of foreign interests.

6. Resolution

Whereas, the impact analyses and general determinations in the foregoing portray a diametrically opposing conclusion than the Proponent's determination of high probability of insignificant effects,

Whereas, sensitive areas of Inner Placentia Bay and environs, fish habitat and fish, especially the important cod and salmon, will deteriorate dramatically, and perish rapidly,

Whereas, fishing activity pertaining, thereto, both commercial and recreational, and related economic activity, will be impacted negatively and substantially,

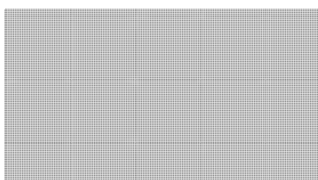
Whereas, the current provincial Cabinet review is one of conflicting interests by those parties which should be responsibly predisposed to a fair, equitable, independent review of the EIS and its process,

Whereas, to restore public confidence in the impartiality of the review process, and to protect the interests of the people and the aquatic environment of Newfoundland and Labrador, and

Whereas, the use of the names of fabled communities for nefarious business practices, the destruction of a pristine environment, negating future sustainable use of vast portions of Inner Placentia Bay and congruent areas, and the negative overall returns to our people and country, is unconscionable,

Therefore,

Be it resolved that: The Grieg NL Salmon Aquaculture Project proposed for Placentia Bay is subject to a public review by a fully, independent, judicial tribunal. As integral part of that commitment of a formal process, the benthic ecosystem is appointed an *amicus tribunos* – someone to represent and speak for the fish, benthic habitat and ecosystem.



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S.19(1)

Honorable Dominic LeBlanc

Minister

Department of Fisheries and Oceans

200 Kent St., Stn. 15N 100

Ottawa

K1A 0E6

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: July-20-18 1:23 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Johnson, Roger; Squires, Susan
Subject: EIS review comments
Attachments: EIS Review_WRMD.pdf; EIS Review_TCII.pdf; EIS Review_ECCC.pdf; EIS Review_DFO.pdf; EIS Review_HC.pdf; EIS Review_FLR.pdf; EIS Review_PPD.pdf; EIS Review_TC.pdf

Hi All,

I've attached the EIS review comments from all EAC members for your review. We'll discuss these comments and formulate some thoughts on a recommendation to the minister during our meeting Tuesday morning. I hope to circulate consolidated public comments early next week for your review.

Please call me at 729-2822 or send me an email if you have any questions or concerns.

PS – If you haven't already replied to the request for a meeting Tuesday, July 24, 2018, from 9:00am -12:30, please do so asap. The meeting request was emailed to you on July 17, 2018.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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EIS REVIEW

Placentia Bay Atlantic Salmon Aquaculture Project (1834)

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
2.1 Study Areas		
a.	JA,BA, CG	
b.	JA, JP, MG	
c.	CH, CG, BA, JK, MG, JP	
d.	JA,DH, VF, JK	Acceptable
e.	CH, CG, JK, BA	
f.	JA, JK, BA, CH, CG	
g.	DW, JK, CH, CG	
2.2 Rationale for the Undertaking		
1 st bullet	All (DH)	No local market anticipated (i.e. all fish for export). (Note: any risk of change to US market due to changes in NAFTA/tariffs?)
2 nd bullet	All (DH)	Acceptable
3 rd bullet	All (DH)	Acceptable
4 th bullet	All (DH)	Acceptable
5 th bullet	All (DH)	Acceptable
2.3.1 General Layout		
a.	All	
b.	DH, VF, JP	Acceptable
c.	JP, AD, VF, MG	
d.	JP,JS	
e.	CH, CG, JK, BA, JP	
f.	JA, CH, CG, JK, BA, JP, MG	
g.	CH, CG, JK, BA, JP, MG	
2.3.2 Construction		
a.	DW, JK	
b.	JP, DH	acceptable
c.	JP, JS	
d.	JP, DH	Acceptable
e.	JP, CH, JK, DW	
f.	JP, DH, MG	Acceptable
g.	JP, AD, MG	
h.	JP, VF, JS, AD	
i.	JS	
j.	AD, VF, MG, JP	

k.	VF, JP, JK, AD	
l.	JP, VF, BA, CG	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
2.3.3 Operation and Maintenance		
a.	DW, JK, CH, DH, VF	Acceptable
b.	DW, JK, CH, BA, CG	
c.	DW, JK, CH	
d.	DW, JK, CH, BA, CG	
e.	DW, JK, CH, BA, CG	
f.	DW, JK, CH, BA, CG, JP	
g.	DW, JK, CH, BA, CG, MG	
h.	DH	

i.	DH	

j.	DW, JK, CH	
k.	DW, JK, CH, VF, JP	
l.	DW, JK, CH, BA, CG, MG, VF, JP	
m.	DW, JK, CH, BA, CG, MG, JA, JP	
n.	DW, JK, CH, BA, CG, MG, AD, JP	
o.	DW, JK, CH, BA, CG, MG, AD, JP	
p.	DW, JK, CH, BA, CG, MG, VF, JP	
q.	JK, CH, BA, CG, MG, VF, JP, AD, JA	
r.	VF, AD, JP, JK, CH, DW	
s.	DW, AD, JP	
t.	AD, DW, CH, JK, JP	
u.	AD, DW, CH, JK, VF, JP	
v.	VF, JP, AD	
w.	VF, JP, AD, CH, JK, BA, CG	
x.	JP, VF, MG	
y.	JK, CH, MG, VF, JP, BA, CG, DH	Acceptable
z.	AD, JK, CH, BA, CG, JP	
aa.	JS	
2.3.4 Decommissioning and Rehabilitation		
a.	JK, JS	
b.	JS	
c.	JK, CH, CG, BA, MG, JP	
d.	CH, CG, BA, MG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/
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		Deficient/ N/A*
2.3.5 Regulatory Frame work		
a.	All	Acceptable
b.	All	Acceptable
c.	All	Acceptable
3.1 Alternatives to the Undertaking		
a.	JK, BA, CH, CG, JS, AD, MG	
b.	JK, BA, CH, CG, JS, AD, MG	
3.2 Alternative Methods of Carrying Out the Undertaking		
a.	JK, BA, CH, CG, JA, MG	
b.	JK, BA, CH, CG, JA	
c.	JK, BA, CH, CG, VF	
d.	JK, BA, CH, CG, TC, EC	
4.1 Key Issues		
1 st bullet	All	Deficient: While the use of sterile triploid Atlantic salmon would work towards preserving the genetic integrity and biological fitness of wild Atlantic Salmon, the potential adverse effect of the presence of the sea cages in and of themselves has not been satisfactorily addressed. While the assurance of no escapes is admirable, there is no detailed analysis of how the cages themselves could potentially affect wild salmon through factors that could include changes in predator behavior and occurrence (and the stress of this increase on wild populations), or the detriment of success to Placentia Bay – if Grieg’s operation is successful, what, if any, safeguards would be implemented to ensure that the Bay is not over subscribed with

c.	DH	
d.	DH	
e.	JP, BA	
f.	JP, BA	

g.	JP, BA	
h.	DW, BA, JK	
4.2.4 Land and Resource Use		
a.	CH, CG, JK, BA, JA	
b.	JA, CH, JK	
c.	JA, MG, JK, CH	
d.	BA, CG, JA	
e.	JA	
4.2.5 Heritage Resources		
a.	JA, JS	
b.	JA, JS	
c.	JA, JS	
d.	JA, JS	
4.2.6 Communities		
a.	JA, AD	
b.	JA, AD	
c.	JA	
d.	JA, JS	
e.	JA	
4.2.7 Economy, Employment, and Business		
a.	JA	
b.	JA	
c.	JS	
d.	JA	
e.	JA, JS	
f.	JA	

*Please provide rationale on an additional page, where applicable.

COMPONENT STUDIES

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.1 Component Study – Wild Atlantic Salmon		
a.	CG, BA, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, BA, CG, JK, CH	
d.	CG, BA, CH, JK	

e.	CH, CG, JK, BA, JP, MG	
f.	CH, CG, JK, BA, JP, MG	
g.	CH, CG, JK, BA, JP, MG	
h.	DW, JK, BA, CH, CG, JP, AD, MG, VF	
i.	DW, VF, AD, TC, JP	

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
4.3.2 Component Study – Fish and Fish Habitat		
a.	CG, BA, JP, CH, JK	
b.	CG, BA, JP, MG, JK, CH	
c.	CG, BA, JP, MG, CH, JK	
d.	CH, JK, DW, JP	
e.	CH, CG, JK, BA, JP, MG	
f.	CH, CG, JK, BA, JP, MG	
g.	DW, VF, AD, JK, CH, TC, JP, BA, CG	

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
4.3.3 Component Study – The Cultural, Recreational, and Commercial Importance of the Waters of Placentia Bay		
a.	CH, CG, JA, MG	
b.	JA	
c.	MG, JA, CH, CG, BA, JP	
d.	CG, BA, JP, JA, CH, JK	

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
4.3.4 Component Study – Aqualine Midgard Sea-Cage Study		
a.	CH, JK, CG, BA	
b.	CH, JK, CG, BA	
c.	CH, JK, CG, BA, JP, MG	
d.	CH, JK, CG, BA, JP	
e.	CH, JK, CG, BA, JP	
EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
5.0 Data Gaps	All	Deficient: While the proponent identifies some significant data gaps, especially with regards to wild salmon stock and fish and fish habitat, there does not

		appear to be any proposed mitigation for addressing these deficiencies.
6.1 Predicted Future Condition of the Environment if the Undertaking Does Not Proceed	All	Deficient – It does not appear as if this was addressed in the sections that the proponent suggests deals with this requirement.
6.2 Predicted Environmental Effects of the Undertaking		
a.	CG, BA, CH, JK, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, CG, BA, CH, JK	
d.	CG, BA, CH, JK, DW	
e.	JP, CG, BA	
f.	CG, BA, CH, JK, DW, AD, VF	
g.	CG, BA, CH, JK, JP, DW	
h.	CH, CG, MG, JA, JP	
i.	JA	
j.	BA, CG, CH, JK, MG, JP	
k.	JP, BA	
l.	CH, JK, JA	
m.	VF, JP	
n.	VF, JS, JP, AD	
6.3 Accidents and Malfunctions		
a.	BA, CG, CH, JK	
b.	VF, JK, DW, CH, JP, AD	
c.	CH, JK, DW, BA, CG, AD, VF, JP	
d.	JK, DW, DH	
e.	CH, JA, MG, JK, JP	
f.	All	
6.4 Cumulative Environmental Effects		
a.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
b.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
c.	JS, AD, MG, JK, CH, JA, BA, CG, JP	
d.	JS, AD, MG, JK, CH, JA, BA, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
6.5 Effects of the Environment on the Project	All	
7.1 Mitigation		
a.	CH, CG, JK, BA, MG	
b.	CH, CG, JK, BA	
c.	CH, CG, JK, BA	
d.	CH, CG, JK, BA	
e.	CH, CG, JK, BA	
f.	CH, CG, JK, BA, JP	
g.	CH, CG, JK, BA, JP, DW	
h.	CH, CG, JK, BA, DW	
i.	CH, CG, JK, BA, DW	
j.	CH, CG, JK, BA, DW	
k.	CH, CG, JK, BA, DW	
l.	DW, AD, VF, JP, CH, JK, CG, BA	
m.	DW, CG, BA, CH, JK, JP	
n.	CH, JK, DW, BA, CG, JP, AD, VF	
o.	JK, DW, CH, AD, VF, JP	
p.	BA, CG, CH, JK, MG, JP	
q.	CG, BA, JK, CH, JP, JA	
r.	JK, DW, CH, AD, JP	
s.	JS, JP, VF, AD	
t.	JP, BA	
7.2 Emergency Response/Contingency Plans		
a.	VF, JP, MG, DH	Deficient – from a source water perspective, the proponent does not address what a response plan/contingency plan would be in place to deal with a catastrophic failure of the groundwater water supply with regards to the hatchery operations and smolt health.
b.	All	
c.	VF, AD, JP, JK, CH, DW	
d.	JK, CH, CG, BA, JP	
e.	DW, JK, CH, AD, VF, JP	
7.3 Waste Management Plan		

a.	VF, JP, AD	
b.	VF, DW, JP, AD, JK, CH, DH	N/A
c.	VF, JP, AD, DH, MG	N/A
d.	CH, JK, JP, MG, JA	
e.	JK, CH, JP, CG, BA, JP, DW	
f.	JK, CH, CG, BA, JP	
g.	VF, DH, JP, CG, BA	Acceptable
h.	VF, JP, JK, AD, JS	
EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
7.4 Environmental Effects Monitoring and Follow-up Program (EEMP)		
a.	CG, BA, JK, CH, DW, JP	
b.	CG, BA, JK, CH, DW, JP	
c.	BA, JK, CH, DW, JP	
d.	CG, BA, JK, CH, DW, JP	
e.	CG, BA, JP	
f.	CH, JK, CG, BA, JP	
g.	DH	
h.	CH, CG, JK, BA, JP	
8.0 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE	All	
9.0 ASSESSMENT SUMMARY AND CONCLUSIONS	All	
10.0 PUBLIC PARTICIPATION	JS	
11.0 ENVIRONMENTAL PROTECTION PLAN (EPP)	All	
13.0 PERSONNEL	All	
14.0 COMMITMENTS MADE IN THE EIS	All	
15.0 COPIES OF REPORTS	JS	

*Please provide rationale on an additional page, where applicable.

EIS OPINION:

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**Pages 1236 to / à 1238
are duplicates of
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pages 1120 to / à 1122**

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pages 1077 to / à 1085**

**Pages 1297 to / à 1306
are duplicates of
sont des duplicatas des
pages 1308 to / à 1317**

Decker, Shelley

From: Johnson, Roger
Sent: Friday, July 20, 2018 2:11 PM
To: Pilgrim, Bret; Decker, Shelley
Subject: FW: EIS Comments_FLR
Attachments: EIS Review_FLR.pdf; 1834_approved EIS guidelines_8Mar18.pdf

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Friday, July 20, 2018 1:54 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Cc: Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>; Squires, Susan <SusanSquires@gov.nl.ca>
Subject: EIS Comments_FLR

Hi Roger,

FLR included references to DFO in their EIS Review Comments (attached), in the table found at the end of the comments, as follows:

- 2.3.3 b - Operation and Maintenance
- 4.2.2 c - Aquatic Environment
- 4.2.2 d - Aquatic Environment
- 4.3.1 d - Component Study – Wild Atlantic Salmon
- 4.3.2 a - Component Study – Fish and Fish Habitat
- 4.3.2 d - Component Study – Fish and Fish Habitat

The review comments reference sections of the EIS guidelines, which are also attached for your convenience. Would you have a look at the comments that refer to DFO and verify if they're correct?

Call me at 729-2822 if you have any questions.

Thanks,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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EIS REVIEW

Placentia Bay Atlantic Salmon Aquaculture Project (1834)

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
2.1 Study Areas		
a.	JA,BA, CG	
b.	JA, JP, MG	N/A
c.	CH, CG, BA, JK, MG, JP	N/A
d.	JA,DH, VF, JK	
e.	CH, CG, JK, BA	
f.	JA, JK, BA, CH, CG	
g.	DW, JK, CH, CG	
2.2 Rationale for the Undertaking		
1 st bullet	All	N/A
2 nd bullet	All	N/A
3 rd bullet	All	N/A
4 th bullet	All	N/A
5 th bullet	All	N/A
2.3.1 General Layout		
a.	All	N/A
b.	DH, VF, JP	
c.	JP, AD, VF, MG	Acceptable
d.	JP,JS	
e.	CH, CG, JK, BA, JP	
f.	JA, CH, CG, JK, BA, JP, MG	Acceptable
g.	CH, CG, JK, BA, JP, MG	Acceptable
2.3.2 Construction		
a.	DW, JK	
b.	JP, DH	
c.	JP, JS	
d.	JP, DH	
e.	JP, CH, JK, DW	
f.	JP, DH, MG	Acceptable
g.	JP, AD, MG	Acceptable
h.	JP, VF, JS, AD	
i.	JS	
j.	AD, VF, MG, JP	Acceptable
k.	VF, JP, JK, AD	
l.	JP, VF, BA, CG	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
2.3.3 Operation and Maintenance		
a.	DW,JK,CH, DH,VF	
b.	DW, JK, CH, BA, CG	
c.	DW, JK, CH	
d.	DW, JK, CH, BA, CG	
e.	DW, JK, CH, BA, CG	
f.	DW, JK, CH, BA, CG, JP	
g.	DW, JK, CH, BA, CG, MG	N/A
h.	DH	
i.	DH	
j.	DW, JK, CH	
k.	DW, JK, CH, VF, JP	
l.	DW, JK, CH, BA, CG, MG, VF, JP	Acceptable
m.	DW, JK, CH, BA, CG, MG, JA, JP	Acceptable
n.	DW, JK, CH, BA, CG, MG, AD, JP	N/A
o.	DW, JK, CH, BA, CG, MG, AD, JP	N/A
p.	DW, JK, CH, BA, CG, MG, VF, JP	N/A
q.	JK, CH, BA, CG, MG, VF, JP, AD, JA	N/A
r.	VF, AD, JP,JK, CH, DW	
s.	DW, AD, JP	
t.	AD, DW, CH, JK, JP	
u.	AD,DW, CH, JK, VF, JP	
v.	VF, JP, AD	
w.	VF, JP, AD, CH, JK,BA, CG	
x.	JP, VF, MG	N/A
y.	JK, CH, MG, VF, JP, BA, CG, DH	Acceptable
z.	AD, JK, CH, BA, CG, JP	
aa.	JS	
2.3.4 Decommissioning and Rehabilitation		
a.	JK, JS	
b.	JS	
c.	JK, CH, CG, BA, MG, JP	Acceptable
d.	CH, CG, BA, MG, JP	N/A

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
2.3.5 Regulatory Frame work		
a.	All	Acceptable (See recommendation # 1 below)
b.	All	N/A
c.	All	Acceptable (See recommendation # 2 below)
3.1 Alternatives to the Undertaking		
a.	JK, BA, CH, CG, JS, AD, MG	N/A
b.	JK, BA, CH, CG, JS, AD, MG	N/A
3.2 Alternative Methods of Carrying Out the Undertaking		
a.	JK, BA, CH, CG, JA, MG	N/A
b.	JK, BA, CH, CG, JA	
c.	JK, BA, CH, CG, VF	
d.	JK, BA, CH, CG, TC, EC	
4.1 Key Issues		
1 st bullet	All	Acceptable
2 nd bullet	All	Acceptable
3 rd bullet	All	Acceptable
4 th bullet	All	Acceptable
4.2.1 Atmospheric Environment		
a.	CH, CG, JK, BA, JP	
b.	CH, CG, JK, BA, JP	
c.	JP, AD, VF, JS	
d.	JP, AD, VF	
4.2.2 Aquatic Environment		
a.	JK, BA, CH, CG	
b.	JK, BA, CH, CG, JP, MG	N/A
c.	JK, BA, CH, CG, JP	
d.	BA, CG, JP	
e.	JK, BA, CH, CG, JP	
f.	JK, BA, CH, CG, JP, MG	N/A
g.	JK, BA, CH, CG, JP	

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.2.3 Terrestrial Environment		
a.	JP, BA	
b.	DH	
c.	DH	
d.	DH	
e.	JP, BA	
f.	JP, BA	
g.	JP, BA	
h.	DW, BA, JK	
4.2.4 Land and Resource Use		
a.	CH, CG, JK, BA, JA	
b.	JA, CH, JK	
c.	JA, MG, JK, CH	Acceptable
d.	BA, CG, JA	
e.	JA	
4.2.5 Heritage Resources		
a.	JA, JS	
b.	JA, JS	
c.	JA, JS	
d.	JA, JS	
4.2.6 Communities		
a.	JA, AD	
b.	JA, AD	
c.	JA	
d.	JA, JS	
e.	JA	
4.2.7 Economy, Employment, and Business		
a.	JA	
b.	JA	
c.	JS	
d.	JA	
e.	JA, JS	
f.	JA	

*Please provide rationale on an additional page, where applicable.

COMPONENT STUDIES

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.1 Component Study – Wild Atlantic Salmon		
a.	CG, BA, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, BA, CG, JK, CH	
d.	CG, BA, CH, JK	
e.	CH, CG, JK, BA, JP, MG	N/A
f.	CH, CG, JK, BA, JP, MG	N/A
g.	CH, CG, JK, BA, JP, MG	N/A
h.	DW, JK, BA, CH, CG, JP, AD, MG, VF	N/A
i.	DW, VF, AD, TC, JP	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.2 Component Study – Fish and Fish Habitat		
a.	CG, BA, JP, CH, JK	
b.	CG, BA, JP, MG, JK, CH	N/A
c.	CG, BA, JP, MG, CH, JK	N/A
d.	CH, JK, DW, JP	
e.	CH, CG, JK, BA, JP, MG	N/A
f.	CH, CG, JK, BA, JP, MG	N/A
g.	DW, VF, AD, JK, CH, TC, JP, BA, CG	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.3 Component Study – The Cultural, Recreational, and Commercial Importance of the Waters of Placentia Bay		
a.	CH, CG, JA, MG	N/A
b.	JA	
c.	MG, JA, CH, CG, BA, JP	Acceptable
d.	CG, BA, JP, JA, CH, JK	

EIS Section	Reviewer	Acceptable/Unacceptable/ Deficient/ N/A*
4.3.4 Component Study – Aqualine Midgard Sea-Cage Study		
a.	CH, JK, CG, BA	
b.	CH, JK, CG, BA	
c.	CH, JK, CG, BA, JP, MG	N/A

d.	CH, JK, CG, BA, JP	
e.	CH, JK, CG, BA, JP	
EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
5.0 Data Gaps	All	N/A
6.1 Predicted Future Condition of the Environment if the Undertaking Does Not Proceed	All	N/A
6.2 Predicted Environmental Effects of the Undertaking - see recommendation #3 below		
a.	CG, BA, CH, JK, DW	
b.	CG, BA, CH, JK, DW	
c.	DW, CG, BA, CH, JK	
d.	CG, BA, CH, JK, DW	
e.	JP, CG, BA	
f.	CG, BA, CH, JK, DW, AD, VF	
g.	CG, BA, CH, JK, JP, DW	
h.	CH, CG, MG, JA, JP	N/A
i.	JA	
j.	BA, CG, CH, JK, MG, JP	N/A
k.	JP, BA	
l.	CH, JK, JA	
m.	VF, JP	
n.	VF, JS, JP, AD	
6.3 Accidents and Malfunctions		
a.	BA, CG, CH, JK	
b.	VF, JK, DW, CH, JP, AD	
c.	CH, JK, DW, BA, CG, AD, VF, JP	
d.	JK, DW, DH	
e.	CH, JA, MG, JK, JP	Acceptable
f.	All	N/A
6.4 Cumulative Environmental Effects		
a.	JS, AD, MG, JK, CH, JA, BA, CG, JP	Acceptable
b.	JS, AD, MG, JK, CH, JA, BA, CG, JP	Acceptable
c.	JS, AD, MG, JK, CH, JA, BA, CG, JP	Acceptable
d.	JS, AD, MG, JK, CH, JA, BA, CG, JP	Acceptable

*Please provide rationale on an additional page, where applicable.

EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
6.5 Effects of the Environment on the Project	All	Acceptable
7.1 Mitigation		
a.	CH, CG, JK, BA, MG	Acceptable (See recommendation # 4 below)
b.	CH, CG, JK, BA	
c.	CH, CG, JK, BA	
d.	CH, CG, JK, BA	
e.	CH, CG, JK, BA	
f.	CH, CG, JK, BA, JP	
g.	CH, CG, JK, BA, JP, DW	
h.	CH, CG, JK, BA, DW	
i.	CH, CG, JK, BA, DW	
j.	CH, CG, JK, BA, DW	
k.	CH, CG, JK, BA, DW	
l.	DW, AD, VF, JP, CH, JK, CG, BA	
m.	DW, CG, BA, CH, JK, JP	
n.	CH, JK, DW, BA, CG, JP, AD, VF	
o.	JK, DW, CH, AD, VF, JP	
p.	BA, CG, CH, JK, MG, JP	Acceptable (See recommendation # 4 below)
q.	CG, BA, JK, CH, JP, JA	
r.	JK, DW, CH, AD, JP	
s.	JS, JP, VF, AD	
t.	JP, BA	
7.2 Emergency Response/Contingency Plans		
a.	VF, JP, MG, DH	Acceptable (See recommendation # 5 below)
b.	All	N/A
c.	VF, AD, JP, JK, CH, DW	
d.	JK, CH, CG, BA, JP	
e.	DW, JK, CH, AD, VF, JP	
7.3 Waste Management Plan		
a.	VF, JP, AD	

b.	VF, DW, JP, AD, JK, CH, DH	
c.	VF, JP, AD, DH, MG	N/A
d.	CH, JK, JP, MG, JA	N/A
e.	JK, CH, JP, CG, BA, JP, DW	
f.	JK, CH, CG, BA, JP	
g.	VF, DH, JP, CG, BA	
h.	VF, JP, JK, AD, JS	
EIS Section	Reviewer	Acceptable/Unacceptable/Deficient/ N/A*
7.4 Environmental Effects Monitoring and Follow-up Program (EEMP)		
a.	CG, BA, JK, CH, DW, JP	
b.	CG, BA, JK, CH, DW, JP	
c.	BA, JK, CH, DW, JP	
d.	CG, BA, JK, CH, DW, JP	
e.	CG, BA, JP	
f.	CH, JK, CG, BA, JP	
g.	DH	
h.	CH, CG, JK, BA, JP	
8.0 RESIDUAL EFFECTS AND DETERMINATION OF SIGNIFICANCE	All	N/A
9.0 ASSESSMENT SUMMARY AND CONCLUSIONS	All	Acceptable
10.0 PUBLIC PARTICIPATION	JS	
11.0 ENVIRONMENTAL PROTECTION PLAN (EPP)	All	Acceptable
13.0 PERSONNEL	All	N/A
14.0 COMMITMENTS MADE IN THE EIS	All	Acceptable
15.0 COPIES OF REPORTS	JS	

*Please provide rationale on an additional page, where applicable.

EIS OPINION:

N/A = not within Transport Canada's mandate.

Acceptable = for those components that fall within Transport Canada's mandate.

Transport Canada has reviewed the EIS and recommends that the following comments be considered:

1. **Section 2.3 Regulatory Framework and Government Oversight:** Since the Rushoon Bay Management Area is located on Federal Waters, Transport Canada must review the proposal for significant adverse environmental effects as per Section 67 of the *Canadian Environmental Assessment Act*, 2012 (CEAA 2012), before issuing a *Navigation Protection Act* (NPA) approval.

2. **Section 2.3 Table 2.2:** Consider adding to Table 2.2:

As per Transport Canada Regulations	Vessel compliance, marine pollution prevention, etc.	<i>Canada Shipping Act, 2001</i>	Transport Canada
-------------------------------------	--	----------------------------------	------------------


3. **Section 7.0 Effects of the Project on the Environment:** Environmental effects of the project on navigation are taken into consideration as part of the environmental review only when the effects are indirect, i.e. resulting from a change in the environment affecting navigation. Direct effects on navigation are not considered in the review, but any measures necessary to mitigate direct effects will be included as terms and conditions associated with the work approved or permitted pursuant to the *Navigation Protection Act*.

4. **Section 2.5 Monitoring and Mitigation Measures:**

Transport Canada recommends the following Mitigation Measures/Best Management Practices:

- Vessels should be compliant with all *Canada Shipping Act, 2001*, requirements for inspection, which includes certification of the vessel and adequate training and appropriate certificate of competency for the operators.
 - Ensure that all vessels will have procedures in place to ensure safeguards against marine pollution: awareness training of all employees, means of retention of waste oil on board and discharge to shore based reception facilities, capacity of responding to and clean-up of accidental spill caused by vessels involved in any particular project.
5. **Appendix T: Emergency Response Plan:** Transport Canada would like to advise the proponent of CANUTEC, which is the Canadian Transport Emergency Centre operated by Transport Canada to assist emergency response personnel in handling dangerous goods emergencies. This national bilingual advisory centre is specialized in interpreting technical information, providing advice, and emergency response. CANUTEC offers

24-hour emergency telephone service at 1-613-996-6666 or *666 on a cellular phone.

Name:  _____

Date: 17 July 2018

**Pages 1318 to / à 1319
are duplicates of
sont des duplicatas des
pages 1151 to / à 1152**



ENVIRONMENTAL IMPACT STATEMENT GUIDELINES

for the

Placentia Bay Atlantic Salmon Aquaculture Project

Prepared by:

The Newfoundland and Labrador Department of Municipal Affairs and Environment

March 8, 2018

**Pages 1321 to / à 1358
are withheld pursuant to section
sont retenues en vertu de l'article**

68(a)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Johnson, Roger

From: Finn, Ray
Sent: Friday, July 20, 2018 2:15 PM
To: Johnson, Roger
Cc: Pike, Kelly J
Subject: FW: Anticipatory Media Lines - Aquaculture

FYI

From: Ruddock, Stella D
Sent: Friday, July 20, 2018 1:59 PM
To: Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>
Cc: Abbass, Lily <Lily.Abbass@dfo-mpo.gc.ca>; Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Carroll, Marlene <Marlene.Carroll@dfo-mpo.gc.ca>; Dunderdale, Sara <Sara.Dunderdale@dfo-mpo.gc.ca>; Whiffen, Sam <Sam.Whiffen@dfo-mpo.gc.ca>; Pittman, Erika <Erika.Pittman@dfo-mpo.gc.ca>; Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>; Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>
Subject: FYI: Anticipatory Media Lines - Aquaculture

Good afternoon Jackie,

The media lines below are related to the ongoing Environmental Impact Statement (EIS) process for Grieg's proposed development in Placentia Bay. They've been reviewed by Lily in Sara's absence, and approved by RD EM.

These are anticipatory only; we plan to keep them on file in the region in case of a media inquiry.

Thanks,
Stella

Anticipatory Media Lines **Environmental assessment of Grieg's proposed operation in Placentia Bay**

Issue

In 2015, Grieg NL registered plans to establish an aquaculture operation in Placentia Bay. In 2016, the provincial Department of Environment and Conservation (now known as Municipal Affairs and Environment) released the undertaking from further environmental assessment. The release was challenged in court, resulting in a court-ordered Environmental Impact Statement (EIS). As per normal provincial Environmental Assessment (EA) process, DFO has been asked to provide advice to the EA Committee.

Strategic Considerations and Public Environment

Grieg's proposed aquaculture operation in Placentia Bay has been under intense media scrutiny from the beginning due to criticism from anti-aquaculture groups.

Some disapproval may be redirected towards DFO by groups concerned that this project will damage wild Atlantic Salmon stocks, and who feel DFO should block the project. The South Newfoundland population of Atlantic Salmon has been assessed under COSEWIC as "threatened." This may add to concerns about the effects Grieg's activities will have on wild salmon.

Recommendation

These media lines are anticipatory if inquiries are received related to DFO's role in the Environmental Impact Statement process. Aquaculture is a provincial lead in NL; therefore, media will be referred to the province for questions outside of DFO's area of responsibility.

Media lines (Responsive)

- DFO has an advisory role in provincial Environment Assessment (EA) processes. DFO routinely reviews provincial EA registrations, Environmental Preview Reports or, as in this case, Environmental Impact Statements, and provides advice relevant to our mandate of protecting Canada's oceans and other aquatic ecosystems from negative impacts.
- DFO-NL has concluded a comprehensive review of the Grieg EIS and has provided advice to the Provincial EA Committee (add link to letter of advice).
- While DFO's responsibilities under the *Fisheries Act* contribute to sustainable aquaculture management, the decision to release the aquaculture project from environmental assessment, or not, lies exclusively with the Province of Newfoundland and Labrador. Contact the Department of Municipal Affairs and Environment for more information on their role.
- Upon completion of the current Environmental Assessment process, and if the Province releases the project, the proponent will be subject to subsequent regulatory approvals for aquaculture site licenses and introductions and transfers, both of which will involve DFO as well as Provincial regulators. More information can be found here: (add link).

Stella Ruddock
Communications Advisor (Ecosystems Management)
Newfoundland and Labrador Region
Fisheries and Oceans Canada/Government of Canada
Stella.Ruddock@dfo-mpo.gc.ca/ Tel: 709-772-7630
Media Inquiries: Media.NL@dfo-mpo.gc.ca/ Tel: 709-772-3375

Follow us on Twitter! @DFO_NL

Johnson, Roger

From: Finn, Ray
Sent: Friday, July 20, 2018 2:17 PM
To: Johnson, Roger
Subject: RE: DFO comments Grieg Aquaculture EIS

If you are still around can you drop up?

From: Johnson, Roger
Sent: Friday, July 20, 2018 2:02 PM
To: Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Subject: FW: DFO comments Grieg Aquaculture EIS

I was not aware that we were to provide recommendations on whether this project should go ahead – I was under the impression that was the job of the EA committee chair (province).

The province has concerns that the amount of clarification we have required will require they tell the proponent to submit an “addendum to the EIS” ??

Any thoughts?

Sorry to bother you [REDACTED] and perhaps I will just hang on to this until Monday (it being 2 pm) and take it up with your “replacement” on Monday.

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Friday, July 20, 2018 12:36 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>
Subject: RE: DFO comments Grieg Aquaculture EIS

Dear Roger,

Thank you for your July 12, 2018 submission of the DFO all-sector review comments regarding the EIS for the Placentia Bay Atlantic Salmon Aquaculture Project. Please note that it is the responsibility of each EAC member to provide professional advice to the EAC Chair, within the context of their agency's mandate, regarding the adequacy of assessment documents and to recommend whether the undertaking being assessed should proceed or not based on its environmental acceptability (see attached Guidelines for EAC which was provided to each EAC member upon appointment by the MAE Minister). DFO has provided a detailed analysis of the EIS, but has not recommended whether: (i) the EIS is acceptable; and (ii) whether the project can proceed in an environmentally acceptable manner. Please review my comments on the attached DFO submission and identify the questions and/or comments posed by DFO that constitute a request for more information at a level of concern that would prevent DFO from making a recommendation as to whether the project can proceed in an environmentally acceptable manner.

It would be appreciated if you would provide your response to me by 4:00pm Monday, July 23, 2018, prior to the EAC meeting on Tuesday morning. Please call me at 729-2822 or send me an email if you have any questions or concerns.

Regards,

Joanne

s.19(1)

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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No information has been removed or severed from this page

Johnson, Roger

From: Finn, Ray
Sent: Sunday, July 22, 2018 8:42 AM
To: Johnson, Roger
Subject: Fw: Letters
Attachments: MIN 200737 - VP hold reply to [REDACTED].docx.pdf; MIN 201114 - VP hold reply to [REDACTED].docx.pdf

2ND attachment is the signed version to [REDACTED]
Best of luck with this tomorrow and Tuesday.

Ray

[REDACTED] (cell)
(709) 772 - 2442. (office)

Sent via Blackberry

From: Atkinson, Mike (CEAA/ACEE) <mike.atkinson@canada.ca>
Sent: Saturday, July 21, 2018 3:56 PM
To: Finn, Ray
Subject: Letters

I found these two letters, but not the one you referenced.

Mike

s.16(2)(c)

s.19(1)



OCT 24 2016

[REDACTED]
Freshwater-Alexander Bays Ecosystem Corporation
P.O. Box 153
Glovertown South NL A0G 2M0

[REDACTED]
Thank you for the correspondence of March 31, 2016, sent on behalf of the Freshwater-Alexander Bays Ecosystem Corporation, concerning the Placentia Bay Atlantic Salmon Aquaculture Project and your request to designate the Project under section 14 of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

After careful consideration of the facts, the scientific advice provided by expert departments, including Fisheries and Oceans, Environment and Climate Change Canada, and Health Canada, and the provincial and federal regulatory mechanisms in place to deal with the potential environmental effects of the Project, I have decided not to designate the Project for environmental assessment under CEAA 2012.

As you are aware, the Project is not described in the *Regulations Designating Physical Activities* under CEAA 2012; therefore, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. were not required to submit a Project Description to the Canadian Environmental Assessment Agency for consideration on whether it was required to conduct a federal environmental assessment.

I understand that the Province of Newfoundland and Labrador conducted a review of the Project's environmental assessment registration under the Newfoundland and Labrador *Environmental Assessment Regulations* of the *Environmental Protection Act*. On July 22, 2016, the Province released the Project from further assessment with specific conditions. Federal departments participated in this process and provided technical expertise.

.../2

s.19(1)

Of note, Fisheries and Oceans Canada has also conducted a science review of the Newfoundland and Labrador Introductions and Transfers European Triploid Atlantic Salmon Risk Assessment. The results of the review are publicly available on the Fisheries and Oceans Canada website at: http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ScR-RS/2016/2016_034-eng.html

The Project and its potential environmental effects will continue to be considered through regulatory processes; in particular, it will be subject to the *Health of Animals Regulations* under the *Health of Animals Act*, as well as the, requirements under the *Fisheries Act*, including the *Fishery (General) Regulations* and the *Aquaculture Activities Regulations*. Fisheries and Oceans Canada is also formally engaged in regulatory reviews conducted under the provincial *Aquaculture Act*, in particular the review of applications for specific aquaculture site licences. Matters concerning fisheries fall within the purview of my colleague, the Honourable Dominic LeBlanc, Minister of Fisheries, Oceans and the Canadian Coast Guard. Matters concerning the health of imported fish eggs for the hatchery fall under the purview of my colleague, the Honourable Lawrence MacAulay, Minister of Agriculture and Agri-Food. I am therefore sending a copy of this correspondence to my colleagues for their information.

I appreciate your bringing these concerns to my attention.

Sincerely,



The Honourable Catherine McKenna, P.C., M.P.
Minister of Environment and Climate Change

c.c.: The Honourable Dominic LeBlanc, P.C., M.P.
 The Honourable Lawrence MacAulay, P.C., M.P.



OCT 24 2016

[REDACTED]
Atlantic Salmon Federation
Newfoundland and Labrador
[REDACTED]

[REDACTED]
Salmonid Council of Newfoundland and Labrador
[REDACTED]

[REDACTED]

Thank you for the correspondence of April 19, 2016, sent on behalf of the Atlantic Salmon Federation and the Salmonid Council of Newfoundland and Labrador, concerning the Placentia Bay Atlantic Salmon Aquaculture Project and your request to designate the Project under section 14 of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

After careful consideration of the facts, the scientific advice provided by expert departments, including Fisheries and Oceans, Environment and Climate Change Canada, and Health Canada, and the provincial and federal regulatory mechanisms in place to deal with the potential environmental effects of the Project, I have decided not to designate the Project for environmental assessment under CEAA 2012.

As you are aware, the Project is not described in the *Regulations Designating Physical Activities* under CEAA 2012; therefore, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. were not required to submit a Project Description to the Canadian Environmental Assessment Agency for consideration on whether it was required to conduct a federal environmental assessment.

.../2

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The Project and its potential environmental effects will continue to be considered through regulatory processes; in particular, it will be subject to the *Health of Animals Regulations* under the *Health of Animals Act*, as well as the, requirements under the *Fisheries Act*, including the *Fishery (General) Regulations* and the *Aquaculture Activities Regulations*. Fisheries and Oceans Canada is also formally engaged in regulatory reviews conducted under the provincial *Aquaculture Act*, in particular the review of applications for specific aquaculture site licences. Matters concerning fisheries fall within the purview of my colleague, the Honourable Dominic LeBlanc, Minister of Fisheries, Oceans and the Canadian Coast Guard. Matters concerning the health of imported fish eggs for the hatchery fall under the purview of my colleague, the Honourable Lawrence MacAulay, Minister of Agriculture and Agri-Food. I am therefore sending a copy of this correspondence to my colleagues for their information.

I appreciate your bringing these concerns to my attention.

Sincerely,



The Honourable Catherine McKenna, P.C., M.P.
Minister of Environment and Climate Change

c.c.: The Honourable Dominic LeBlanc, P.C., M.P.
The Honourable Lawrence MacAulay, P.C., M.P.

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: July-23-18 8:48 AM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Johnson, Roger
Cc: Squires, Susan
Subject: Agenda for EAC Meeting, July 24, 2018
Attachments: EAC Meeting Agenda_24Jul18.docx

Good Morning Folks,

I've attached an agenda for our meeting tomorrow morning. Later today I'll forward the documents we'll be reviewing, just in case we have any issues with skype. To date, the following members have sent a meeting reply:

Attending

Dorothea Hanchar
Carole Grant
Roger Johnson
Jonathan Kawaja

Declined

Vicki Ficzero
Chris Hendry
Melissa Ginn

EA Director, Susan Squires, will also be attending.

The following committee members have not replied:

Blair Adams
Daryl Whelan
Allison Denning
Jerry Pulchan
John Angelopoulos

Please let me know asap (today) whether you will be attending the meeting and indicate whether your attendance will be in person or via skype. Call me if you have any questions or concerns.

Regards,

Joanne

Joanne Sweeney

Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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EAC Meeting Agenda
Jul 24, 2018
Gros Morne Room
Department of Municipal Affairs and Environment
4th Floor Confederation Building West

- | | |
|----------------------|---|
| 1. 9:00 – 10:00am | EIS Review Comments from EAC |
| 2. 10:00-11:00am | Summary of Public Comments to date |
| 3. 11:00am – 12:00pm | Environmental costs and benefits of project |
| 4. 12:00- 12:30 | Recommendation |

Johnson, Roger

From: Johnson, Roger
Sent: Monday, July 23, 2018 10:12 AM
To: Grant, Carole
Subject: RE: Geig

Thanks for getting back to me [REDACTED]

I just wanted to fill you in on a conversation Ray, Barry, Jackie and myself had on Friday. Perhaps we could talk for a few minutes before meeting tomorrow.

From: Grant, Carole
Sent: Monday, July 23, 2018 10:08 AM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: Re: Geig

[REDACTED] Agreed to attend meeting tomorrow though.

Anything in particular you'd like to discuss?

I assume you received the email from Joanne Sweeney re meeting details?

Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Monday, July 23, 2018 7:57 AM
To: Grant, Carole
Subject: Geig

Could we have a chat sometime before the meeting with the province tomorrow.

Also if you have a meeting invite could you pass it along as I do not have details

s.16(2)(c)

s.19(1)

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

Johnson, Roger

From: Johnson, Roger
Sent: Monday, July 23, 2018 2:32 PM
To: Bieger, Tilman
Subject: FW: DFO comments Grieg Aquaculture EIS
Attachments: EA comments _DFO EIS review.doc; EAC Guidelines.pdf

Another very tricky file from last week. This was discussed last Friday afternoon with Ray, RD science and RDG.

Notice the wording in what exactly they want from us – weather the project can proceed in an environmentally acceptable manner – they have indicated this for every comment we made in our 9 pages of comments.

I have spoken with EA committee chair today and they want two questions answered : 1) do we need an addendum to the EIS to answer our numerous questions 2) can the project proceed in an environmentally acceptable manner

- 1) the questions we have asked in our comments are quite straight forward and an addendum would be slight and easy to prepare so I see this as a good option
- 2) For question number 2 the thinking Friday was that the minister of ECCC in 2016 said that the regulatory phase would be assessment enough and that the feds would not make a pronouncement on environmental acceptability.

The province would like an answer tomorrow but I have indicated before we would “write it down” I need some further consultation with my managers (you)

– you will need another just from my stuff LOL

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Friday, July 20, 2018 12:36 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>
Subject: RE: DFO comments Grieg Aquaculture EIS

Dear Roger,

Thank you for your July 12, 2018 submission of the DFO all-sector review comments regarding the EIS for the Placentia Bay Atlantic Salmon Aquaculture Project. Please note that it is the responsibility of each EAC member to provide professional advice to the EAC Chair, within the context of their agency's mandate, regarding the adequacy of assessment documents and to recommend whether the undertaking being assessed should proceed or not based on its environmental acceptability (see attached Guidelines for EAC which was provided to each EAC member upon appointment by the MAE Minister). DFO has provided a detailed analysis of the EIS, but has not recommended whether: (i) the EIS is acceptable; and (ii) whether the project can proceed in an environmentally acceptable manner. Please review my comments on the attached DFO submission and identify the questions and/or comments posed by DFO that constitute a request for more information at a level of concern that would prevent DFO from making a recommendation as to whether the project can proceed in an environmentally acceptable manner.

It would be appreciated if you would provide your response to me by 4:00pm Monday, July 23, 2018, prior to the EAC meeting on Tuesday morning. Please call me at 729-2822 or send me an email if you have any questions or concerns.

Regards,

s.19(1)

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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**Pages 1373 to / à 1391
are duplicates of
sont des duplicatas des
pages 1088 to / à 1106**

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: July-24-18 8:33 AM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Johnson, Roger
Cc: Sweeney, Joanne; Squires, Susan
Subject: Review docs_meeting this morning
Attachments: Summary EAC Comments_EIS.docx; EA review_DFO comments.docx; Advantages and Disadvantages Analysis.docx; EIS Recommendation.docx; draft_common concerns_Grieg EIS.docx; draft_public support_Grieg EIS.docx

I've attached the documents we'll be reviewing at this morning's meeting.

Talk soon,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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**Pages 1393 to / à 1405
are withheld pursuant to section
sont retenues en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

DFO EIS review comments

Potential COR

2.5. Monitoring and Mitigation Measures, Page 100. *“A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project...”*. These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan, Page 31. It states that “if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented.” This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals.

Potential EPP

2.5. Monitoring and Mitigation Measures, Pg 92: What are the contents of an escape response kit?

Accidents and Malfunctions, pg 123: Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear. Please revisit and discuss interaction with lost gear.

Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles. The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same applies to Table 7.12 and 7.13.

Wild Atlantic Salmon Component Study, Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set. (refers to recapture of escapes)

Potential EEMP

Executive Summary, Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event may not be the best approach for determining whether farmed salmon have entered freshwater. Follow-

up monitoring should be determined in consultation with DFO. These consultations are currently ongoing and should reflex this throughout the EIS.

Section 7.8. Follow-up Monitoring, Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Wild Atlantic Salmon Component Study, Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Potential Advice in release letter/ attachment

Section 2.5. Monitoring and Mitigation Measures, Page 107. The EIS states “*In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene*”. The statement is incorrect. Security breaches should be handled by the RCMP.

Wild Atlantic Salmon Component Study, Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending ‘several months’ in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater in Newfoundland systems.

Wild Atlantic Salmon Component Study, Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017.

Section 6.0. Effects of the Environment on the Project, Page 351.

Superchill. “*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*” The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.

7.0. Effects of the Project on the Environment, Page 364. When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time periods should be identified as minimum fallowing times.

7.7. Accidents and Malfunctions, Page 436. DFO advises that the EIS document seems to mix up juvenile and adult surveys. Also, the statement “older individuals” is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d’Espoir in the fall 2017 surveys.

Wild Atlantic Salmon Component Study, Page 4, Para. 2. Please correct the statement that “after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...” as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.

Wild Atlantic Salmon Component Study, Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.

Wild Atlantic Salmon Component Study, Page 32. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that ‘recapture nets will be checked four times daily while deployed’. Depending on time of year when recapture efforts occur, and if it’s deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Potential Addendum

Page 144. Wind and Wave Action. Due to its nature, the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used basic bathymetry and coastline (GEBCO and CHS 15s) which limits its applications in coastal areas. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.

4.2.3. Fish and Fish Habitat, Page, 154. Water Temperature. There are bay wide long term data available from other sources that should be included in this assessment (see Bedford Institute of Oceanography’s Oceanographic Databases; and DFO’s Marine Environmental Data Section). (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Fish and Fish Habitat, Page 154. Figures 4.6 and 4.7, Standard deviations to illustrate the variability should be provided in these figures. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Fish and Fish Habitat, Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document. Please revise for consistency.

4.2.3. Fish and Fish Habitat, Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the Fisheries Act. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels.
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or will be collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

4.2.3. Fish and Fish Habitat. Page 166. There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

4.2.3. Wild Atlantic Salmon, page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as “threatened.” COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.

4.2.3. Wild Atlantic Salmon, Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015).

4.4.2.3. Domestic Fisheries in the Study Area, Page 208. The statement “*currently there is a shift back to a groundfish-based fishery (Fig. 4.17).*” is not clear from figure referenced. It’s recommended to add other supporting literature.

4.8. Data Gaps, Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. As the BMAs will not be fallowed simultaneously, a discussion of potential overall cumulative organic deposition and chemical persistence should be included especially in light of the lack of data on salinity and currents.

6.0. Effects of the Environment on the Project, Page 352. Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

7.0. Effects of the Project on the Environment, Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects. Please provide further detail.

7.0. Effects of the Project on the Environment, Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included. Indirect genetic effects and ecological interactions with wild Atlantic Salmon should also be discussed.

7.0. Effects of the Project on the Environment, Page 369. Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of ‘acceptable’ organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Section 7.1.2.6 Sea Cage Sites (p. 370). Please provide thresholds to be used if known.

7.7. Accidents and Malfunctions, Page 435. “*Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.*” This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify.

Wild Atlantic Salmon Component Study, Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department’s counting

facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid). The document cites improved triploidy induction method but data is not provided nor does it appear to be published. Sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Please clarify.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report. The ocean current time-series used for this study are too short to provide statistically robust estimates of dispersion. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance of low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Other time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012).

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Fish and Fish Habitat Component Study, Page 63. *A more recent paper by Ma et al. (2017) on surge in the Study Area should be referenced and discussed.*

Grieg EIS Public Review Comments

Common public concerns regarding potential environmental effects

1. Grieg did not collect original data and did not study migration patterns and routes of wild Atlantic salmon. This information is needed in order to assess the potential effects on wild salmon from disease and parasites from farmed salmon as they migrate near sea cages. The lack of data on wild salmon was one of the main reasons why the EIS was ordered, but Grieg has made no effort to collect any data.
2. The Proponent plans to locate at least 17 of its sea cages less than 20 km from scheduled and unscheduled salmon rivers, even though DFO recommends sea cages be at least 20-30km from salmon rivers.
3. The extent to which pesticides and antibiotics are likely to be used has not been fully acknowledged, and the potential impact of the use of these chemicals on the environment has not been adequately assessed. The proponent states that antibiotics and pesticides will only be used as a last resort, but provides no benchmarks or when they will be used.
4. The project will have a devastating effect on wild Atlantic salmon stocks in Placentia Bay.
5. Open net pens are being banned in other parts of the world, while land based alternatives are now favored. Why isn't this happening here?
6. The Proponent claims their eggs will be 100% sterile, triploid eggs, but there is no scientific evidence to support this within the EIS. Grieg states that Stofnfiskur is using smaller chambers of 2 litres for the pressurization process, which increases the rate of triploidy induction from 98% to 100%, but provides no evidence to show that smaller 2 litre pressure chambers increases the rates of triploidy induction.
7. Grieg does not fully analyze alternatives for the project and provides inaccurate information to justify rejecting other alternatives, especially land-based. Their methodology is very subjective and biased, with no economic data to verify their conclusion.
8. There is no plan to deal with sea ice and pack ice. Figure 4.5 shows that there is 1-15% change sea ice will occur in PB during the winter. For the same week, the 30 year median of ice concentration where the sea cages are located is 90+%. Grieg says when this occurs the sea cages will be towed, but only if the water temperature is greater than 4 degrees Celsius. This would not be feasible with 90+% ice coverage, since the sea cages are 50 meters in diameter.
9. The Proponent has not considered the weather/sea conditions that can be experienced at the proposed sea cage locations. The sea cages and other equipment, such as barges, will never hold up to the tides and storm surges in this bay.
10. Grieg does not provide sufficient detail to know how much feces and uneaten food has to be removed along with the other waste in the RAS. This raises a serious concern of whether there is an environmentally acceptable plan to deal with the considerable, but unknown, amount of organic waste produced by the 7 million salmon in the RAS hatchery.

11. Deposition from the sea cages will cause a lot of harm to environment, and an accurate description of the amount of food and feces that will be deposited has not been provided. Deposits of excess feed and feces from sea cages will change the ecology of the area around the sea cages, create dead zones, cause algal blooms, and increase predation of wild fish eggs/larvae in the area. The EIS states that fish waste at the sea cage sites will either be flushed by the currents or settle to the sea floor. Current at several sites is only 20 cm/s, and to flush, the current needs to be around 50 cm/s. Therefore, fish waste and uneaten food will likely settle below the cages.
12. The proposed follow-up monitoring programs are inadequate. Grieg plans to visually inspect cages, at a minimum, every 90 days. It is recommended that the inspections be done at least once every 30 days from May to November. This is the period of time when salmon are migrating near the marine cages.
13. Consuming farmed salmon is not as healthy as eating wild salmon, and many think it is the most toxic food you can eat.
14. There is uncertainty whether or not there will be sufficient quantities of lumpfish available to eliminate sea lice and whether lumpfish will effectively manage/eliminate sea lice amongst farmed salmon. There are no commercial suppliers of lumpfish in Canada, and in NL the culture of lumpfish is at best experimental. Grieg may have to use pesticides if lumpfish are unavailable and/or ineffective, but has not evaluated the effects of pesticides on the environment and has not proposed mitigations for the effects of pesticides on the surrounding aquatic environment.
15. Aqualine Midgard Sea Cage Component Study is deficient and not prepared according to EIS Guidelines. There is no evidence to demonstrate that the individuals are experts and no evidence that the panel actually prepared any of the material presented in the study. No evidence that data was generated locally or testing was done locally. Study appears to be promotional material provided by the supplier, Aqualine Midgard.

Page 1414

**is withheld pursuant to section
est retenue en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Grieg EIS Public Comments

Most common reasons for supporting the project

1. This project will create much needed employment on the Burin Peninsula will contribute to the economic stability of the region.
2. This project could result in the development of other businesses in the area and could help support existing businesses.
3. This project will create economic growth, not only in Marystown, but across the whole island.
4. The Burin Peninsula has been hit hard in past years, with the closure of major fish plants in the region. There has been mass unemployment and no major industry to sustain the population.
5. Grieg NL has followed all the required regulations/guidelines and has provided all the necessary information that indicates that there will be no adverse effect on the environment.
6. Aquaculture is not the problem with our wild salmon stocks, overfishing is.
7. Grieg will introduce state-of-the-art, modern technology to the NL aquaculture industry that provides a higher level of environmental protection than current aquaculture practice.
8. No previous opportunity has come to this region that will provide the growth and employment that will be provided by the Grieg NL project. It's an opportunity that may not present itself again.

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: July-24-18 2:34 PM
To: Johnson, Roger
Cc: Grant, Carole; Squires, Susan
Subject: EA categorization_DFO Grieg EIS comments
Attachments: EA review_DFO comments_24Jul.docx

Hi Roger,

As discussed this morning, I've attempted to categorize DFO's comments on the Grieg EIS in the attached documents. Please review and advise whether DFO is in agreement with these categories and further categorize the comments as you see fit.

Call me at 729-2822 or send an email if you have any questions or concerns.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

"This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender."

DFO EIS review comments

Potential COR

2.5. Monitoring and Mitigation Measures, Page 100. *“A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project...”*. **These data would be highly valuable to industry regulators and should be made available.** Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan, Page 31. It states that “if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented.” This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals.

Internal DFO discussion needed

Potential EPP

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Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles. The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same applies to Table 7.12 and 7.13.

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Potential EEMP

Executive Summary, Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event may not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO. These consultations are currently ongoing and should reflex this throughout the EIS.

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Wild Atlantic Salmon Component Study, Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017.

Section 6.0. Effects of the Environment on the Project, Page 351.

Superchill. “*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*” The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.

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Potential Addendum

Page 144. Wind and Wave Action. Due to its nature, the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used basic bathymetry and coastline (GEBCO and CHS 15s) which limits its applications in coastal areas. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.

4.2.3. Fish and Fish Habitat, Page, 154. Water Temperature. There are bay wide long term data available from other sources that should be included in this assessment (see Bedford Institute of Oceanography’s Oceanographic Databases; and DFO’s Marine Environmental Data Section). (To be referred to proponent for response. Please advise

whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Fish and Fish Habitat, Page 154. Figures 4.6 and 4.7, Standard deviations to illustrate the variability should be provided in these figures. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Fish and Fish Habitat, Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document. Please revise for consistency.

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Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the Fisheries Act. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels.
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or will be collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

4.2.3. Fish and Fish Habitat. Page 166. There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in

Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

4.2.3. Wild Atlantic Salmon, page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as “threatened.” COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.

4.2.3. Wild Atlantic Salmon, Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015).

4.4.2.3. Domestic Fisheries in the Study Area, Page 208. The statement “*currently there is a shift back to a groundfish-based fishery (Fig. 4.17).*” is not clear from figure referenced. It’s recommended to add other supporting literature.

4.8. Data Gaps, Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. As the BMAs will not be fallowed simultaneously, a discussion of potential overall cumulative organic deposition and chemical persistence should be included especially in light of the lack of data on salinity and currents.

6.0. Effects of the Environment on the Project, Page 352. Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

7.0. Effects of the Project on the Environment, Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects. Please provide further detail.

7.0. Effects of the Project on the Environment, Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included. Indirect genetic effects and ecological interactions with wild Atlantic Salmon should also be discussed.

7.0. Effects of the Project on the Environment, Page 369. Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of ‘acceptable’ organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Section 7.1.2.6 Sea Cage Sites (p. 370). Please provide thresholds to be used if known.

7.7. Accidents and Malfunctions, Page 435. *“Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.”* This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify.

Wild Atlantic Salmon Component Study, Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department’s counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

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Pilgrim, Bret

From: Pilgrim, Bret
Sent: July-25-18 11:44 AM
To: Johnson, Roger
Subject: EA review_DFO comments_24Jul BBP.docx
Attachments: EA review_DFO comments_24Jul BBP.docx

Categories: Red Category

See attached.

Bret

DFO EIS review comments

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1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels.
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or will be collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

4.2.3. Fish and Fish Habitat. Page 166. There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in

Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

4.2.3. Wild Atlantic Salmon, page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as “threatened.” COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.

4.2.3. Wild Atlantic Salmon, Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015).

4.4.2.3. Domestic Fisheries in the Study Area, Page 208. The statement “*currently there is a shift back to a groundfish-based fishery (Fig. 4.17).*” is not clear from figure referenced. It’s recommended to add other supporting literature.

4.8. Data Gaps, Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. As the BMAs will not be fallowed simultaneously, a discussion of potential overall cumulative organic deposition and chemical persistence should be included especially in light of the lack of data on salinity and currents.

6.0. Effects of the Environment on the Project, Page 352. Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

7.0. Effects of the Project on the Environment, Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects. Please provide further detail.

7.0. Effects of the Project on the Environment, Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included. Indirect genetic effects and ecological interactions with wild Atlantic Salmon should also be discussed.

7.0. Effects of the Project on the Environment, Page 369. Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of ‘acceptable’ organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Section 7.1.2.6 Sea Cage Sites (p. 370). Please provide thresholds to be used if known.

7.7. Accidents and Malfunctions, Page 435. *“Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.”* This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify.

Wild Atlantic Salmon Component Study, Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid). The document cites improved triploidy induction method but data is not provided nor does it appear to be published. Sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Please clarify.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report. The ocean current time-series used for this study are too short to provide statistically robust estimates of dispersion. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance of low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Other time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012).

Fish and Fish Habitat Component Study, Page 28. *“The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track.”* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Fish and Fish Habitat Component Study, Page 36. *“In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay.”* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *“Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important.”*

Fish and Fish Habitat Component Study, Page 63. *A more recent paper by Ma et al. (2017) on surge in the Study Area should be referenced and discussed.*

Johnson, Roger

From: Johnson, Roger
Sent: Thursday, July 26, 2018 9:12 AM
To: Bieger, Tilman
Cc: Pilgrim, Bret
Subject: Grieg letter
Attachments: EA comments _DFO EIS review 2.doc

Please consider this somewhere between straw dog and 2nd draft

Yellow may require some thought/explanation

Need to get this out today or tomorrow at latest

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 26, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project*

In response to your recent inquires and our recent meetings I would like to clarify Fisheries and Oceans Canada (DFO) comments on the proposed Grieg project. DFO did a detailed review of the Environmental Impact Statement and have provided detailed comments for your consideration.

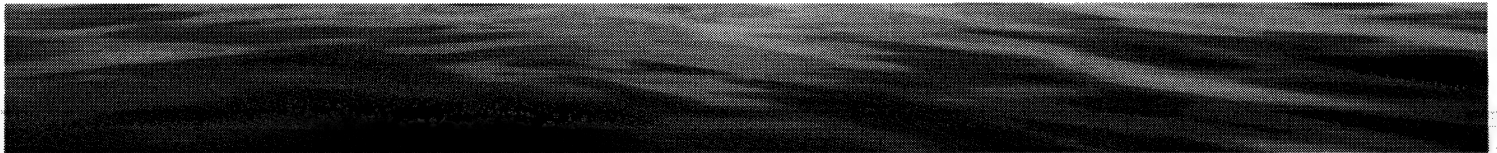
Thank you for working diligently to ensure that comments submitted by DFO to the Province of Newfoundland and Labrador in relation to the Grieg Aquaculture Environmental Impact Statement will be addressed within the province's, advice to the proponent, Conditions of Release or used to guide the proponent's development of the project's Environmental Protection Plan and the Environmental Effects Monitoring Plan. While we consider the additional comments not addressed important, the Department is of the view that these comments will be addressed during the regulatory phase of the project.

In relation to your request that DFO provide "*a recommendation as to whether the project may proceed in an environmentally manner*"; the department will defer to the position of the Federal Government as articulated by the Minister of Environment and Climate Change in 2016 stating that a Federal EA was not required, however, potential negative environmental impacts will be considered through the federal regulatory process, i.e. regulations under the *Fisheries Act*, specifically, the *Fishery (General) Regulations* and the *Aquaculture Activities Regulations*.

Thank you for providing the opportunity to review and provide comment on this project EIS Report. If you have any questions or comments with respect to the above or if you require anything further please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca).

Sincerely,

Roger Johnson



Senior Fisheries Protection Biologist
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: July-26-18 9:50 AM
To: Johnson, Roger
Subject: FW: Grieg letter
Attachments: EA comments _DFO EIS review 2.doc

Thanks Roger

I used my red pen a bit, see attached tracked edits

Maybe I edited prematurely – I think I need to have another chat with you on this to understand clearly what we are looking to say here.

Could you send me the letter we are responding to please, and then arrange to come up this morning for a chat. I am free til noon right now

Thx

From: Johnson, Roger
Sent: July-26-18 9:12 AM
To: Bieger, Tilman
Cc: Pilgrim, Bret
Subject: Grieg letter

Please consider this somewhere between straw dog and 2nd draft

Yellow may require some thought/explanation

Need to get this out today or tomorrow at latest

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)



Fisheries and Oceans
Canada

Pêches et Océans
Canada

P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 26, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: Review of the Environmental Impact Statement for the Placentia Bay Atlantic Salmon Aquaculture Project

In response to your recent inquires and our recent meetings I would like to clarify Fisheries and Oceans Canada (DFO) comments on the proposed Placentia Bay Atlantic Salmon Aquaculture Project project.

Our Department has reviewed the Environmental Impact Statement (EIS) for this project thoroughly and has provided detailed comments for your consideration.

We appreciate and thank you for your efforts to incorporate our comments in the development of advice or conditions the Province may issue for this project, including the Environmental Protection Plan and the Environmental Effects Monitoring Plan. While we consider the additional comments not addressed important, the Department is of the view that these comments will be addressed during the regulatory phase of the project.

In relation to your request that DFO provide "a recommendation as to whether the project may proceed in an environmentally manner"; the Department will defer to the position articulated by the federal Minister of Environment and Climate Change in relation to this project in 2016, which stated that a federal environmental assessment was not required, and that potential negative environmental impacts under federal jurisdiction will be considered and addressed through the relevant federal regulatory processes, including under the federal Fishery (General) Regulations and the Aquaculture Activities Regulations.

Thank you for providing the opportunity to review and provide comment on this EIS. If you have any questions or comments on this matter please contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca.).

Sincerely,

Roger Johnson
Senior Fisheries Protection Biologist

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Comment [D1]: Awkward wording, let's try to adjust.

Comment [D2]: Word missing?

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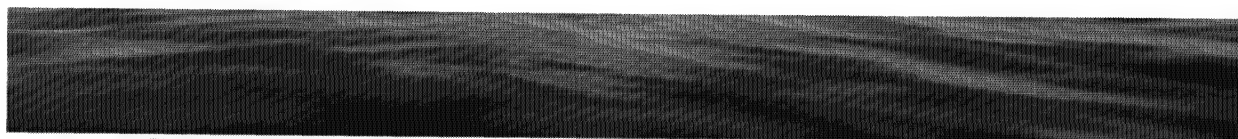
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Fisheries and Oceans
Canada

Pêches et Océans
Canada



Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

DRAFT

No information has been removed or severed from this page

From: Butcher, Ashley
Sent: July-26-18 11:37 AM
To: Minister / Ministre (DFO/MPO)
Cc: Valerio, Michael
Subject: FW: FFAW-Unifor Response on EIS for Placentia Bay Project Proposed by Grieg NL
Attachments: 2018-07-25 FFAW Response to Grieg EIS Submission.pdf

Categories: For Info

FYA

Ashley Butcher
DMO
613-947-4561

From: O'Halloran, Mark
Sent: Thursday, July 26, 2018 10:20 AM
To: Butcher, Ashley <Ashley.Butcher@dfo-mpo.gc.ca>
Subject: FW: FFAW-Unifor Response on EIS for Placentia Bay Project Proposed by Grieg NL

Hey Ashley,

Can you send the attached letter from the FFAW to MCU to draft a reply for review by MINO.

Thanks,
Mark

From: Keith Sullivan [REDACTED]
Sent: July 25, 2018 9:11 AM
To: Jonathan.Wilkinson@parl.gc.ca; O'Halloran, Mark <Mark.O'Halloran@dfo-mpo.gc.ca>
Subject: FFAW-Unifor Response on EIS for Placentia Bay Project Proposed by Grieg NL

Dear Minister:

Please see the attached FFAW-Unifor's response on the Environmental Impact Statement (EIS) for the Placentia Bay Atlantic Salmon Aquaculture Project proposed by Grieg NL. You are copied on this letter which was sent earlier today to the appropriate government department of the Province of Newfoundland and Labrador.

Keith Sullivan

Keith Sullivan
President

FFAW | unīFOR
T: 709-576-7276
W: ffaw.nf.ca

s.19(1)

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368 Hamilton Avenue, 2nd Floor
St. John's NL A1C 5H5

No information has been removed or severed from this page

PO Box 10, Station C
368 Hamilton Avenue, 2nd Floor
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Tel: 709.576.7276
Fax: 709.576.1962
Web: www.ffaw.nf.ca

KEITH SULLIVAN
President

DAVID DECKER
Secretary-Treasurer

July 25, 2018

Joanne Sweeney
Project Environmental Assessment Chair
Department of Municipal Affairs and Environment, Environmental Assessment Division
West Block, Confederation Building
PO Box 8700, St. John's, NL A1B 4J6

Dear Ms. Sweeney:

On behalf of the members of FFAW-Unifor, we submit the following comments on the Environmental Impact Statement (EIS) for the Placentia Bay Atlantic Salmon Aquaculture Project proposed by Grieg NL.

As an important stakeholder in Placentia Bay, FFAW-Unifor continues to have serious concerns regarding the process, namely the lack of consultation. Inviting written comments on an initiative such as this is not adequate or proper consultation by a government department responsible for managing aquaculture and wild catch fisheries. *Issues Scan of Selected Coastal and Ocean Areas of Newfoundland and Labrador*, a report prepared for the then (2007) Department of Fisheries and Aquaculture and Department of Environment and Conservation, calls into question the effectiveness of aquaculture associated consultations when conducted by the industry. We do not believe proper consultations have taken place at this point in time.

The promise of aquaculture must be weighed along with the current value and importance of the inshore fishery and healthy marine environment. There are fundamental differences between how the aquaculture and fishing industries operate. Aquaculture operations are known to have some degree of an impact on the marine environment as well as the potential to limit fishing grounds around sites chosen for grow out operations. Section 46 of Newfoundland and Labrador's *Environmental Protection Act* indicates,

"The Purpose of this Part is to

- (a) protect the environment and quality of life of the people of the province; and
- (b) facilitate the wise management of the natural resources of the province, through the institutions of environmental assessment procedures before and after the commencement of an undertaking that may be potentially damaging to the environment."

Fish harvesters are concerned about lost crab, lobster, cod and other fishing grounds and habitat. Furthermore, there are concerns about other affects on wild fish, such as parasites and disease, environmental contamination and navigational hazards which the wild harvest industry will have to deal with if this project is approved.

Sales of fish products from Placentia Bay rely on the ability to emphasize the value of harvest from a pristine marine environment. Placentia Bay is the largest body of water in Newfoundland and Labrador and is also the marine space in the province seeing the highest level of industrial activity. Placentia Bay has instances,

even if rare, of arctic ice and icebergs which can be a considerable environmental threat where aquaculture takes place. We must emphasize that any consideration for development cannot be considered in isolation. Other industrial activities have all had an impact on wild fish harvesting effort and incurred cost for fish harvester navigation in Placentia Bay. Before pursuing further development, a full understanding of the cumulative effects of industrial activity is necessary.

On behalf of our members, FFAW-Unifor would highlight that the impact assumed by the company in the EIS is much less than the actual impact for the fish harvesters in Placentia Bay. Harvesters have continually raised the concern that the spatial impact of any infrastructure in the bay is greater than its specific location. The at-sea cages will impact fish harvesters in a number of ways, amongst others:

- With tides and currents in Placentia Bay fish harvesters will not risk setting gear near the sites for fear of getting it tangled with the at-sea infrastructures;
- the impact will also be by the at-sea cages, becoming navigational hazards in dense fog and inclement weather; and
- a permanent presence of at-sea cages with feed and traffic, is likely to result in some behavioural changes to other marine species in Placentia Bay.

In all conversations prior to the EIS, Grieg NL asserted that the at-sea cages were escape proof. The tone is changed slightly in the EIS with the admission on page xxxiv that, "(a)lthough mitigation measures and monitoring procedures are in place to prevent fish escapes, it is still possible that some salmon may escape from the sea cages." FFAW-Unifor would question if the assertion that the Midgard Systems have not had any escapes is influenced by thresholds requiring mandatory reporting within the various jurisdictions where they are currently being used.

Consultations with the fishing industry appear to have been relatively haphazard. There were a number of meetings with fish harvesters before FFAW-Unifor was engaged by the proponent. The common theme through these "consultations" with the fishing industry is that there was a commitment to investigate alternate placement or adjustments to some of the sea cage sites, however there were no proper follow-ups to show the harvesters what changes were made.

The continuation of consultation is particularly pertinent when it comes to the placement of the sea cages and other marine activities. It is clear that at this point in time, Grieg NL has only been issued a site hold from the Government of Newfoundland and Labrador –the lack of consideration for this through the EIS process has been appalling. Harvesters are strongly concerned that if the project receives approval in the absence of application for specific sites, Government will be hamstrung to accept the applications for the sea cages if the EIS process has a favourable outcome for the company. FFAW-Unifor is of the understanding that Grieg NL is not considering applying for the sea cages until the completion and approval of the EIS process.

Harvesters have noted that there have been changes to the intended sea cage sites over time. All consultations that have not included the most recent, or intended, locations, have not provided the fish harvesters as the key stakeholders in Placentia Bay to fully participate and accept the ongoing consultation process.

In all the discussions with fish harvesters where FFAW-Unifor has been involved, there was no mention of the fact that Grieg NL intends to kill and bleed fish on a dead hold vessel at the sea cage sites. It had been

indicated that the fish was going to be transferred live from the sea cage sites, to be killed and bled at the processing facility, this is certainly not what is being set forth on pages 75-76 of the main text of the EIS.

When the EIS process commenced and the Draft Guidelines were released, FFAW-Unifor was approached by the company. Our first comment was that although the timing was not ideal – being in the middle of the busiest time for harvesters – that meetings must be held around the bay again. The company offered to do one meeting in St. John's and then to consider other meetings, citing timeline challenges as the concerns for further meetings.

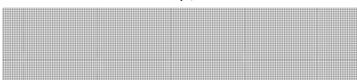
The meeting on March 17th, 2018 is perceived by FFAW-Unifor and the members who were in attendance as a token meeting to check a box. The meeting did not involve any presentation of materials by the proponent; rather the company was suggesting harvesters ask questions without any context. Further, there was only an hour set aside for this conversation with the fish harvester representatives from Placentia Bay, which is not conducive to a developing a better understanding nor is it conducive to advancing efforts toward transparency.

Prior to any finfish aquaculture going into Placentia Bay, proper baseline studies must be conducted for any marine sites. Such studies must look at species composition and behaviour prior to the development and installation of sea cages. Such studies would have to be ongoing throughout the project activities to determine potential negative effects on the marine environment and wild catch species behaviour.

Furthermore, the consideration of on land aquaculture should be addressed as it can severely mitigate or eliminate concerns of environmental damage and impacts on those making a living from the healthy marine environment of Placentia Bay.

FFAW-Unifor strongly advises not to move forward with any project approval until government has pursued a proper consultation process with fish harvesters, as this project may put the livelihood of harvesters in the area at risk. Government must be responsible for meaningful consultation and be part of the entire process when such major projects are proposed. FFAW-Unifor further advises not to move forward with an approval until proper and meaningful consultations are undertaken with regards to the whole project being proposed by Grieg – this includes the sea-farms for which the company has not applied for at this time.

Yours Sincerely,



Keith Sullivan
President, FFAW-Unifor

Cc: Hon. Jonathan Wilkinson, P.C., M.P. Minister of Fisheries, Oceans and the Canadian Coast Guard
Hon. Dwight Ball, Premier
Hon. Andrew Parsons, Minister of Municipal Affairs and Environment
Hon. Gerry Byrne, Minister of Fisheries and Land Resources

Johnson, Roger

From: Bieger, Tilman
Sent: Friday, July 27, 2018 11:22 AM
To: Johnson, Roger
Subject: EA comments DFO EIS review 2 TB.doc
Attachments: EA comments DFO EIS review 2 TB.doc

Importance: High

Check this out and see if I have misconstrued or lost key points

Slightly longer – maybe there are bits that should be cut out....

Maybe efficient if you drop up when ready



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 27, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement for the Placentia Bay Atlantic Salmon Aquaculture Project*

I write to follow up on recent email correspondence and meetings with officials of Municipal Affairs and Environment about the environmental assessment (EA) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project, specifically the comments our Department recently provided on the Environmental Impact Statement (EIS) for this project.

We understand, based on discussions at recent meetings of the EA Committee for this project, that many of the comments we provided (particularly those relating to mitigation measures) could adequately be addressed in conditions the Province would stipulate or require for this project, such as the Environmental Protection Plan and the Environmental Effects Monitoring Plan. We thank you for your efforts to incorporate those recommendations in this manner.

There are a number of other comments remaining, notably those relating to the assessment of potential risks to wild salmon from escaped farm fish, which we consider essential to have addressed in order for us to recommend that the EIS is acceptable. Our personnel will continue to work with your officials to identify and prioritize these to enable them to be addressed as efficiently as possible.

In recent correspondence, your officials have indicated an expectation that our Department provide a recommendation on "*whether the project can proceed in an environmentally acceptable manner*". The federal Minister of Environment and Climate Change determined in 2016 that this project did not require a federal environmental assessment, and that potential impacts under federal jurisdiction would be considered and addressed through relevant federal regulatory processes, including under the federal *Fisheries Act*, *Fishery (General) Regulations* and the *Aquaculture Activities Regulations*. We will continue to provide advice and comments on the provincial EIS for the project in accordance with this position.

Thank you for providing the opportunity to review and provide comments on this EIS. If you have further questions or comments on this matter, you can contact me or our representative on the EA Committee, Roger Johnson by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca).

Sincerely,



Tilman Bieger
A/Regional Director - NL Region
Ecosystems Management Branch
Fisheries and Oceans Canada

DRAFT

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Johnson, Roger

From: Johnson, Roger
Sent: Friday, July 27, 2018 1:07 PM
To: Bieger, Tilman
Subject: RE: EA comments DFO EIS review 2 TB.doc
Attachments: July 27 letter.doc

Please see attached – some minor edits in first couple of lines nad in the last paragraph

From: Bieger, Tilman
Sent: Friday, July 27, 2018 11:43 AM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: Re: EA comments DFO EIS review 2 TB.doc

And btw I am fine reverting to you signing to keep "normalized". But suggest as acting mgr FPP rr

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman
Sent: Friday, July 27, 2018 11:22 AM
To: Johnson, Roger
Subject: EA comments DFO EIS review 2 TB.doc

Check this out and see if I have misconstrued or lost key points

Slightly longer – maybe there are bits that should be cut out....

Maybe efficient if you drop up when ready



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

July 27, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement for the Placentia Bay Atlantic Salmon Aquaculture Project*

I write to follow up on recent correspondence with officials of Municipal Affairs and Environment about the environmental assessment (EA) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project, specifically the comments our Department recently provided on the Environmental Impact Statement (EIS) for this project.

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There are a number of other comments remaining, notably those relating to the assessment of potential risks to wild salmon from escaped farm fish, which we consider essential to have addressed in order for us to recommend that the EIS is acceptable. Our personnel will continue to work with your officials to identify and prioritize these to enable them to be addressed as efficiently as possible.

In recent correspondence, your officials have indicated an expectation that our Department provide a recommendation on "*whether the project can proceed in an environmentally acceptable manner*". The federal Minister of Environment and Climate Change determined in 2016 that this project did not require a federal environmental assessment, and that potential impacts under federal jurisdiction would be considered and addressed through relevant federal regulatory processes, including under the federal *Fisheries Act*, *Fishery (General) Regulations* and the *Aquaculture Activities Regulations*. We will continue to provide advice and comments on the provincial EIS for the project in accordance with this position.



Thank you for providing the opportunity to review and provide comments on this EIS. If you have further questions or comments on this matter, you can contact Roger Johnson by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca).

Sincerely,

Roger Johnson
A/Manager, Fisheries Protection – Regulatory Review
Ecosystems Management Branch
Fisheries and Oceans Canada

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: July-27-18 3:01 PM
To: Pike, Kelly J
Subject: FW: Week of July 30th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Attachments: AES for August 6.docx

Grieg

From: Pike, Kelly J
Sent: July-26-18 1:47 PM
To: Bieger, Tilman; Tulk, Kirby; Sullivan, Katrina; Johnson, Roger; Careen, Ellen; Coffin, David; Janes, Jennifer
Subject: FW: Week of July 30th - AES Issues, Reports and Consultations Report / Upcoming Decisions

Good Afternoon;

For your input and/or Nil response to me before **Noon, Friday, July 27th**.

Thanks Donna
For Kelly

From: Genier, Sylvie
Sent: Thursday, July 26, 2018 1:32 PM
To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Cochrane, Kim <Kim.Cochrane@dfo-mpo.gc.ca>; Hickson, Cindy <Cindy.Hickson@dfo-mpo.gc.ca>; Rossignol, Pauline <Pauline.Rossignol@dfo-mpo.gc.ca>; Wilson, Teresa M <Teresa.Wilson@dfo-mpo.gc.ca>; XCA-Grp, RDGO <XCA-Grp-RDGO@dfo-mpo.gc.ca>; Johal, Sharan <Sharan.Johal@dfo-mpo.gc.ca>; Hébert, Linda M <Linda.Hebert@dfo-mpo.gc.ca>; Pallard, Jessica <Jessica.Pallard@dfo-mpo.gc.ca>; Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Couturier-Dubé, Geneviève <Genevieve.Couturier-Dube@dfo-mpo.gc.ca>; Kaba, Kyle <Kyle.Kaba@dfo-mpo.gc.ca>; Landry, Anne <Anne.Landry@dfo-mpo.gc.ca>
Cc: Daspe, Caroline <Caroline.Daspe@dfo-mpo.gc.ca>
Subject: Week of July 30th - AES Issues, Reports and Consultations Report / Upcoming Decisions

Hi all / Bonjour,

**Please note this request is for items pertaining to Aquatic Ecosystems Sector only /
Veuillez noter que cette demande concerne uniquement les articles appartenant au secteur des écosystèmes aquatiques**

Please update (in the language of your choice) the attached report with a regional perspective and return to me **by 10am on Monday, July 30th (Eastern Time)**.

Please note if no response is received by the timeline provided, it will be considered a NIL response.

Please note this request is for the period of August 6th to August 17th

Veuillez fournir vos données (dans la langue de votre choix), incluant la perspective régionale pour le rapport ci-joint **par 10h00 lundi le 30 juillet. (heure de l'est).**

S'il vous plaît noter si aucune réponse n'est reçue par le temps fourni, il sera considéré comme une réponse NUL.

SVP noter que cette demande est pour la période du 6 août au 17 août

Thank you/Merci.

Sylvie Genier

Scheduling Coordinator / Coordinatrice de l'agenda

Senior Assistant Deputy Minister / Bureau du sous-ministre adjoint

Ecosystems & Fisheries Management / Écosystèmes et Gestion de Pêches

613-993-2734

=====

Guidelines for Issues, Reports & Consultations report / Lignes directrices pour le rapport d'enjeux, de rapports et de consultations:

Issues expected for the next two weeks (from August 6 – August 17, 2018)

Enjeux prévus pour les prochaines deux semaines (à partir du 6 août – 17 août)

Anticipated reports, studies, publications, etc. Please identify any reports expected for public release whether they are from DFO or from others but with implications for DFO (to be released before **August 17, 2018**).

Rapports anticipés, études, publications, etc. Veuillez identifier tous les rapports en attente pour publication - même s'il s'agit d'un rapport du MPO ou provenant d'autres organismes avec des implications pour le MPO (date de publication avant le **17 août**).

Meetings/consultation planned for August 6 – August 17, 2018

Rencontres/consultations prévues pendant la période à partir du 6 août – 17 août 2018

[Redacted text block]

When you transmit the info, please indicate which issues, reports or consultations should be included in the Week at a Glance - these are the same issues that the Commissioner or SADM will be raising during the Round Table.

[Redacted text block]

Lorsque vous transmettez les renseignements, veuillez indiquer quels enjeux, rapports ou consultations devraient être inclus dans le Coup d'œil sur la semaine – ceux-ci correspondent aux enjeux que le Commissaire ou le Sous-ministre adjoint principal soulèveront durant la table-ronde.

TAB 10 - UPCOMING ISSUES AND DECISIONS / ONGLET 10 – PROCHAINS ENJEUX ET DÉCISIONS

SECRET

#	ISSUE /PROBLÈME	DESCRIPTION	IMPACT / EFFET	NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
Aquatic Ecosystems Sector / Secteur des écosystèmes aquatiques – August 6th to August 17th / du 6 août au 17 août				
1	Grieg NL Placentia Bay Project Environmental Assessment	<p>The NL Department of Municipal Affairs and Environment (MAE) is carrying out an environmental assessment (EA) of a large aquaculture project proposed by Grieg NL in Placentia Bay (in response to a court decision that the previous release of the project from EA was not appropriate). Departmental officials are participating in the provincial EA Committee along with other federal and provincial authorities.</p> <p>The public review period for the Environmental Impact Statement (EIS) has concluded. A number of stakeholder groups submitted input critical of the EIS.</p> <p>The Department has provided comments on the EIS based on a DFO science advisory process that examined the EIS. These included recommendations that the proponent provide additional information, including on the potential for and risks associated with escapement of farmed fish.</p> <p>The provincial Minister is scheduled to make a decision about the adequacy of the EIS on July 31, which would lead to a recommendation on the project being made to provincial cabinet by the end of August.</p>	<p>The recommendations made by the Department could contribute to or support a decision by the Province to delay approval of the EIS and require additional study. This could be criticized by the proponent or provincial authorities promoting the project.</p> <p>Conversely, these DFO recommendations would be applauded by stakeholder groups opposed to the project.</p>	<p>Draft media lines have been prepared in the event that DFO receives inquiries on this issue.</p> <p>Regional officials will continue to liaise with provincial officials to support their efforts to have the EIS improved and deemed adequate.</p>

TAB 10 - UPCOMING ISSUES AND DECISIONS /
ONGLET 10 – PROCHAINS ENJEUX ET DÉCISIONS

SECRET

#	ISSUE / PROBLÈME	DESCRIPTION	IMPACT / EFFET	NEXT STEPS / STATUS	
				PROCHAINES ÉTAPES / SITUATION	

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: July-27-18 3:11 PM
To: Butler, Annette
Subject: Re: Letter to Province on Grieg EIS

Hi Annette. Would Jackie have time for a quick chat on this this afternoon? Thx

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman
Sent: Friday, July 27, 2018 2:29 PM
To: Perry, Jacqueline
Cc: Butler, Annette
Subject: Letter to Province on Grieg EIS

Hello Jackie we are preparing to send a letter to the provincial director of environmental assessment, Susan Squires about the environmental impact statement EIS for the Grieg project.

Key messages are:

- we are limiting our input on the EA for this project to comments on the adequacy of the EIS, and will not take a position on the "acceptability of the project overall"
- there currently are some gaps in the EIS that need to be addressed before we can deem it adequate
- these gaps should not be terribly difficult to address and we can help that get done efficiently

We'd like to send today – and would like check with you if any concerns

Full text below and I am available to discuss this afternoon.

Tilman

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement for the Placentia Bay Atlantic Salmon Aquaculture Project*

I write to follow up on recent correspondence with officials of Municipal Affairs and Environment about the environmental assessment (EA) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project, specifically the comments our Department recently provided on the Environmental Impact Statement (EIS) for this project.

We understand, based on discussions at recent meetings of the EA Committee for this project, that many of the comments we provided (particularly those relating to mitigation and monitoring measures) could adequately be addressed in conditions the Province would stipulate or require for this project, such as the Environmental Protection Plan and the Environmental Effects Monitoring Plan. We thank you for your efforts to incorporate those recommendations in this manner.

There are a number of other comments we made remaining, notably those relating to assessment of the potential for impacts of escapement of farm fish, which we consider essential to have addressed in order for us to recommend that the EIS is acceptable. Our personnel will continue to work with your officials to identify and prioritize these to enable them to be addressed as efficiently as possible.

In recent correspondence, your officials have indicated an expectation that our Department provide a recommendation on "*whether the project can proceed in an environmentally acceptable manner*". The Minister of Environment and Climate Change for Canada determined in 2016 that this project did not require a federal environmental assessment, and that potential impacts under federal jurisdiction would be considered and addressed through appropriate regulatory processes, including under the federal *Fisheries Act*, *Fishery (General) Regulations* and the *Aquaculture Activities Regulations*. In accordance with this position, we will continue to limit our advice on this EA to commenting on the EIS.

Thank you for providing the opportunity to review and provide comments on this EIS. If you have further questions or comments on this matter, you can contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca).

Sincerely,

Roger Johnson
A/Manager, Fisheries Protection – Regulatory Review
Ecosystems Management Branch
Fisheries and Oceans Canada

Bieger, Tilman

From: Bieger, Tilman
Sent: July-27-18 3:49 PM
To: Johnson, Roger
Subject: Re: Grieg letter

If there are any delays finalizing or u have to leave I could send under my name - but appreciating you closing this off

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman
Sent: Friday, July 27, 2018 3:47 PM
To: Johnson, Roger
Subject: Re: Grieg letter

Thanks Roger I am mtg Jackie at 4

Sorry for delay....

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Friday, July 27, 2018 3:28 PM
To: Bieger, Tilman
Subject: RE: Grieg letter

Standing by

From: Bieger, Tilman
Sent: Friday, July 27, 2018 3:27 PM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: Grieg letter

I haven't connected w Jackie yet.

You could sign the version as is before u leave. Or maybe just wait a few mins til I am off the conf call I am on

Sent from my BlackBerry 10 smartphone on the Bell network.

Johnson, Roger

From: Grant, Carole
Sent: Friday, July 27, 2018 3:55 PM
To: Johnson, Roger
Subject: Fw:

Roger,

As discussed, below is the response from Ian re the live gene-banking proposed by the Province. [REDACTED]
[REDACTED], I didn't have a chance to follow-up with NCR re any departmental position/policies under development on this topic that might be used moving forward.

If you have any questions or wish to discuss, please let me know.

Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bradbury, Ian R <Ian.Bradbury@dfo-mpo.gc.ca>
Sent: Thursday, July 26, 2018 10:46 AM
To: Grant, Carole
Cc: Robertson, Martha; Van Leeuwen, Travis; Veinott, Geoff
Subject: Re:

Hi Carole,

We have sampled 28 different rivers in the bay, even if we decided that LGB was an effective management tool which the data is mixed, the size of such an endeavour would be staggering. I think the best we can do is to establish the most complete baseline we can, to provide the tools to monitor and manage accordingly. Additional counts and monitoring of interactions would probably be better use of any funds.

Ian

Dr. Ian Bradbury
Research Scientist, Salmonids Section
Science Branch, Fisheries and Oceans Canada
80 East White Hills Road, P. O. Box 5667
St. John's, NL, Canada, A1C 5X1
Website: Bradburygeneticslab.com
Ph: (709) 772-3869
Email: Ian.bradbury@dfo-mpo.gc.ca

s.13(1)(c)

s.19(1)

s.21(1)(b)

On Jul 25, 2018, at 6:00 PM, Grant, Carole <Carole.Grant@dfo-mpo.gc.ca> wrote:

Had EA Committee meeting yesterday for Greig proposal. [REDACTED]

[REDACTED] I thought this was a bit extreme and indicated that I wasn't sure whether the Department would support doing this given the ongoing review re stocking. Thoughts?

Sent from my BlackBerry 10 smartphone on the Bell network.

No information has been removed or severed from this page

Johnson, Roger

From: Pilgrim, Bret
Sent: Friday, July 27, 2018 4:34 PM
To: Johnson, Roger
Cc: Bieger, Tilman; Griffiths, Helen
Subject: FW: Greig Aquaculture Letter
Attachments: Greig Letter DFO-Province July 27.pdf

FYI – See attached/email below

From: Pilgrim, Bret
Sent: July-27-18 4:33 PM
To: Squires, Susan
Cc: joannesweeney@gov.nl.ca
Subject: Greig Aquaculture Letter

Ms. Squires,

Please see the attached letter in relation to recent correspondence regarding the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Regards,

Bret

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562



P.O. Box 5667
St. John's, NL A1C 5X1

Your file

Votre référence

July 27, 2018

Our file

Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

***Re: Review of the Environmental Impact Statement for the Placentia Bay
Atlantic Salmon Aquaculture Project***

I write to follow up on recent correspondence with officials of Municipal Affairs and Environment about the environmental assessment (EA) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project, specifically the comments our Department recently provided on the Environmental Impact Statement (EIS) for this project.

We understand, based on discussions at recent meetings of the EA Committee for this project, that many of the comments we provided (particularly those relating to mitigation and monitoring measures) could adequately be addressed in conditions the Province would stipulate or require for this project, such as the Environmental Protection Plan and the Environmental Effects Monitoring Plan. We thank you for your efforts to incorporate those recommendations in this manner.

There are a number of other comments we made remaining, notably those relating to assessment of the potential for impacts of escapement of farm fish, which we consider essential to have addressed in order for us to recommend that the EIS is acceptable. Our personnel will continue to work with your officials to identify and prioritize these to enable them to be addressed as efficiently as possible.



In recent correspondence, your officials have indicated an expectation that our Department provide a recommendation on "*whether the project can proceed in an environmentally acceptable manner*". The Minister of Environment and Climate Change for Canada determined in 2016 that this project did not require a federal environmental assessment, and that potential impacts under federal jurisdiction would be considered and addressed through appropriate regulatory processes, including under the federal *Fisheries Act*, *Fishery (General) Regulations* and the *Aquaculture Activities Regulations*. In accordance with this position, we will continue to limit our advice on this EA to commenting on the EIS.

Thank you for providing the opportunity to review and provide comments on this EIS. If you have further questions or comments on this matter, you can contact me by phone (709.772.3296) or email (roger.johnson@dfo-mpo.gc.ca).

Sincerely,

Roger Johnson
A/Manager, Fisheries Protection – Regulatory Review
Ecosystems Management Branch
Fisheries and Oceans Canada

Johnson, Roger

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Monday, July 30, 2018 2:46 PM
To: Bieger, Tilman
Cc: Pilgrim, Bret; Squires, Susan; Johnson, Roger; Griffiths, Helen
Subject: RE: DFO EIS review - Placentia Bay Atlantic Salmon Aquaculture Project

Thanks Tilman, much appreciated.

Joanne

From: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Sent: Monday, July 30, 2018 2:45 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Cc: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Squires, Susan <SusanSquires@gov.nl.ca>; Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: RE: DFO EIS review - Placentia Bay Atlantic Salmon Aquaculture Project

Hello Joanne

As you may know already, Roger [REDACTED]

We will follow up with you as soon as possible, by tomorrow at latest.

Tilman

A/Regional Director, Ecosystems Management

s.19(1)

Tilman Bieger

*Acting Director – Oceans Management | Directeur Intérimaire, Gestion des Océans
Ecosystems Management | Gestion des écosystèmes
Fisheries & Oceans Canada | Pêches et Océans Canada
NL Region | Région de Terre Neuve
Office | Bureau (709) 772-8737
Cell | Tél. cellulaire (709) 685-7526
Fax | Télécopieur (709) 772-7862*

From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: July-30-18 2:22 PM
To: Johnson, Roger
Cc: Bieger, Tilman; Pilgrim, Bret; Squires, Susan
Subject: DFO EIS review - Placentia Bay Atlantic Salmon Aquaculture Project

Good Afternoon Roger,

Please see the attached response to your letter of July, 27, 2018, regarding the EIS review of the above-noted project. I look forward to meeting with you or, in your absence, an appropriate designate(s) from DFO to further discuss DFO's review of the Grieg aquaculture EIS. Please contact me at 729-2822 or send me an email to arrange for a meeting.

Regards,

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

"This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender."

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No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: July-30-18 2:51 PM
To: Griffiths, Helen; Careen, Ellen
Subject: FW: DFO EIS review - Placentia Bay Atlantic Salmon Aquaculture Project
Attachments: ea reply_dfo lett_30Jul18.pdf

Helen when you get back in let's have a chat on this at earliest opportunity. You can just drop up or arrange a time via Kelly.

We need to tell the Province which of our comments/recommendations on the Grieg project EIS truly need to be addressed in order for us to consider the document acceptable.

Ellen including you FYI and possible participation if you are available.

Thanks

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: July-30-18 2:22 PM
To: Johnson, Roger
Cc: Bieger, Tilman; Pilgrim, Bret; Squires, Susan
Subject: DFO EIS review - Placentia Bay Atlantic Salmon Aquaculture Project

Good Afternoon Roger,

Please see the attached response to your letter of July, 27, 2018, regarding the EIS review of the above-noted project. I look forward to meeting with you or, in your absence, an appropriate designate(s) from DFO to further discuss DFO's review of the Grieg aquaculture EIS. Please contact me at 729-2822 or send me an email to arrange for a meeting.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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July 30, 2018

EA Registration #1834

Mr. Roger Johnson
A/ Manager, Fisheries Protection Program-Regulatory Review
Ecosystems Management Branch, Fisheries and Oceans Canada
P.O. Box 5667
St. John's NL A1C 5X1

**Re: Review of the environmental impact statement for the Placentia Bay Atlantic
Salmon Aquaculture Project**

Dear Mr. Johnson:

Thank you for your letter of July 27, 2018, indicating that your department will continue to work with the environmental assessment committee (EAC) to identify, prioritize, and address environmental impact statement (EIS) review comments provided by DFO regarding the above-noted project.

The EAC is currently analyzing the EIS review comments submitted by the public, and by government agencies represented on the EAC, and is considering the options for providing a recommendation to the Minister of the Department of Municipal Affairs and Environment (MAE), which include:

- a) releasing the project subject to conditions;
- b) finding the EIS deficient and requiring additional information;
- c) recommending that the project not proceed.

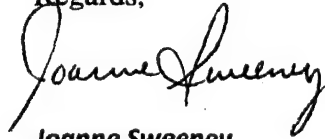
As noted in the EAC Chair's correspondence on July 20 and 24, 2018, the EAC is seeking direction as to whether some of the EIS concerns raised by DFO have been addressed by information provided in the EIS, have been satisfied through discussions held during the EAC meeting on July 24, 2018, or whether the additional information can be required as a potential condition of release, or in an EPP or EEMP, or in an EIS addendum. In your July 27, 2018 letter, you indicated that it is essential to have a number of comments addressed before DFO can make a recommendation as to the acceptability of the EIS.

- 2 -

It is important that we meet to discuss these issues, at your earliest convenience, so that the EAC may proceed with making a recommendation to the MAE Minister. Please call me at 729-2822 or email joannesweeney@gov.nl.ca to arrange a meeting. Feel free to invite appropriate DFO staff who are familiar with the file, and I'll extend an invitation to senior EA staff. I can arrange a meeting room at the Confederation Building.

I look forward to hearing from you.

Regards,



Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

Johnson, Roger

From: Pike, Kelly J
Sent: Monday, July 30, 2018 4:44 PM
To: Griffiths, Helen
Cc: Bieger, Tilman; Finn, Ray; Hendry, Christopher; Careen, Ellen; Johnson, Roger
Subject: FW: FOR INFO 2018-001-01510 re: EIS for Placienta Bay salmon project
Attachments: MECTS-#3943943-v2-Main_Docs_2018-001-01510.pdf

Sorry Ellen, I understand this falls under FPP-RR so fwding to Helen for review in Roger's absence.

From: Pike, Kelly J
Sent: Monday, July 30, 2018 4:36 PM
To: Careen, Ellen <Ellen.Careen@dfo-mpo.gc.ca>
Cc: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>; Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>; Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>
Subject: FW: FOR INFO 2018-001-01510 re: EIS for Placienta Bay salmon project

FYI- please let me know if you have any concerns.

From: Butler, Annette
Sent: Monday, July 30, 2018 4:28 PM
To: Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>; Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>; Finn, Ray <Ray.Finn@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Cochrane, Kim <Kim.Cochrane@dfo-mpo.gc.ca>
Subject: FW: FOR INFO 2018-001-01510 re: EIS for Placienta Bay salmon project

Good afternoon,

The attached is provided for your information/review. Please advise if you have any comments/concerns.

Thank you,

Annette

From: Shah, Maryam
Sent: 2018-July-30 4:19 PM
To: Butler, Annette; Paquette, Michael
Cc: Jaremek, Daniel; Newman, Jesse; Valerio, Michael; Pallard, Jessica; Dawe, Lana; Beckford, Ebonie; Kennedy, Lori
Subject: FOR INFO 2018-001-01510 re: EIS for Placienta Bay salmon project

Docket No.: 2018-001-01510

Subject: "Please see the attached FFAW-Unifor's response on the Environmental Impact Statement (EIS) for the Placentia Bay Atlantic Salmon Aquaculture Project proposed by Grieg NL."

Addressed to: Joanne Sweeney from Department of Municipal Affairs and Environment, Newfoundland and Labrador. Minister Wilkinson.

Correspondent: Keith Sullivan, president, FFAW Unifor

Attached is correspondence that the Minister was only copied on. The Ministerial Correspondence Unit (MCU) has assessed that a reply from the Minister is not necessary and will not take any further action.

This INFO docket is being sent to you for your information only; please distribute as appropriate to others within DFO who may have an interest in the issue(s) raised in the correspondence.

Maryam Shah

Student Writer, Ministerial Correspondence Unit
Fisheries and Oceans Canada / Government of Canada

Maryam.Shah@dfo-mpo.gc.ca 613-991-0284

XNCR-GrpCW/RC@dfo-mpo.gc.ca to contact all MCU Writers

XNCR-GrpCA/AC@dfo-mpo.gc.ca to contact all MCU Analysts

Rédactrice étudiante, Unité de la correspondance ministérielle
Pêches et Océans Canada / Gouvernement du Canada

Maryam.Shah@dfo-mpo.gc.ca 613-991-0284

XNCR-GrpCW/RC@dfo-mpo.gc.ca pour rejoindre tous les rédacteurs d'UCM

XNCR-GrpCA/AC@dfo-mpo.gc.ca pour rejoindre tous les analystes d'UCM

👤👤👤👤👤👤👤👤👤👤👤👤👤👤👤👤

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: July-31-18 6:40 AM
To: Griffiths, Helen
Subject: Fw: URGENT INFORMAL: Grieg EIS

Importance: High

Helen for discussion this morning. Thx

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>
Sent: Monday, July 30, 2018 8:43 PM
To: Bieger, Tilman; Finn, Ray
Cc: Pike, Kelly J; Perry, Jacqueline
Subject: Fw: URGENT INFORMAL: Grieg EIS

Hi Tilman,

Can you please draft a response to this request for RDG approval.

DUE RDGO: ASAP

Thank you,

Annette

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butcher, Ashley <Ashley.Butcher@dfo-mpo.gc.ca>
Sent: Monday, July 30, 2018 8:41 PM
To: Butler, Annette
Cc: Kahn, Zoe; Jarjour, Jasmine; Malko, Carol; Khwaja, Saba
Subject: URGENT INFORMAL: Grieg EIS

Hi Annette -

MINO received an inquiry from PMO, who had been contacted by the province of NL on this issue. They're looking for information from the Department before noon, Tuesday:

An inquiry from the province was received asking what additional information DFO requires for the Grieg EIS and potential impacts on wild salmon? Could the Department please provide more information on this?

Thanks!

Ashley

Bieger, Tilman

Subject: Grieg EIS comments
Location: Tilman office

Start: Tue 31/07/2018 9:30 AM
End: Tue 31/07/2018 10:00 AM
Show Time As: Tentative

Recurrence: (none)

Organizer: Bieger, Tilman

Ellen I have invited you even though I realize you may be committed to interviews

Pilgrim, Bret

From: Pilgrim, Bret
Sent: July-31-18 1:33 PM
To: Decker, Shelley
Subject: EA review_DFO comments_24Jul (3).docx
Attachments: EA review_DFO comments_24Jul (3).docx

Categories: Red Category

**Pages 1469 to / à 1474
are duplicates of
sont des duplicatas des
pages 1417 to / à 1422**

Griffiths, Helen

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: July-31-18 2:07 PM
To: Griffiths, Helen
Cc: Squires, Susan; Bieger, Tilman
Subject: EA Review of DFO EIS Comments
Attachments: EA review_DFO comments_24Jul (002).docx

Hi Helen,

Here's a copy of the comments I sent to Roger Johnson on July 24, 2018, after the EAC meeting. Feel free to call me at 729-2822 if you wish to discuss.

Looking forward to meeting with DFO later this week. Let me know which day/times work best for you.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

"This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender."

DFO EIS review comments

Potential COR

2.5. Monitoring and Mitigation Measures, Page 100. *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project..."*. These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan, Page 31. It states that "if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented." This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals.

Internal DFO discussion needed

Potential EPP

2.5. Monitoring and Mitigation Measures, Pg 92: What are the contents of an escape response kit?

Accidents and Malfunctions, pg 123: Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear. Please revisit and discuss interaction with lost gear.

Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles. The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same applies to Table 7.12 and 7.13.

Wild Atlantic Salmon Component Study, Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set. (refers to recapture of escapes)

Potential EEMP

Executive Summary, Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event may not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO. These consultations are currently ongoing and should reflex this throughout the EIS.

Section 7.8. Follow-up Monitoring, Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Wild Atlantic Salmon Component Study, Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Potential Advice in release letter/ attachment

Section 2.5. Monitoring and Mitigation Measures, Page 107. The EIS states "*In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene*". The statement is incorrect. Security breaches should be handled by the RCMP.

Wild Atlantic Salmon Component Study, Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater in Newfoundland systems.

Wild Atlantic Salmon Component Study, Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017.

Section 6.0. Effects of the Environment on the Project, Page 351.

Superchill. "*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*" The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.

7.0. Effects of the Project on the Environment, Page 364. When referencing fallow period, it is stated that in Newfoundland and Labrador, the mandatory fallowing time after harvesting is seven months for a sea cage site and four months for a BMA. These time periods should be identified as minimum fallowing times.

7.7. Accidents and Malfunctions, Page 436. DFO advises that the EIS document seems to mix up juvenile and adult surveys. Also, the statement “older individuals” is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d’Espoir in the fall 2017 surveys.

Wild Atlantic Salmon Component Study, Page 4, Para. 2. Please correct the statement that “after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...” as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.

Wild Atlantic Salmon Component Study, Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized. Consult with DFO prior to finalizing a recapture plan.(internal DFO discussion needed)

Wild Atlantic Salmon Component Study, Page 32. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that ‘recapture nets will be checked four times daily while deployed’. Depending on time of year when recapture efforts occur, and if it’s deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Potential Addendum

Page 144. Wind and Wave Action. Due to its nature, the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used basic bathymetry and coastline (GEBCO and CHS 15s) which limits its applications in coastal areas. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.

4.2.3. Fish and Fish Habitat, Page, 154. Water Temperature. There are bay wide long term data available from other sources that should be included in this assessment (see Bedford Institute of Oceanography’s Oceanographic Databases; and DFO’s Marine Environmental Data Section). (To be referred to proponent for response. Please advise

whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Fish and Fish Habitat, Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).

4.2.3. Fish and Fish Habitat, Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document. Please revise for consistency.

4.2.3. Fish and Fish Habitat, Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important (economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the Fisheries Act. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessels.
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or will be collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

4.2.3. Fish and Fish Habitat. Page 166. There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in

Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

4.2.3. Wild Atlantic Salmon, page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as “threatened.” COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. More discussion of historical and current studies should be provided.

4.2.3. Wild Atlantic Salmon, Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018; Bradbury et al. 2015).

4.4.2.3. Domestic Fisheries in the Study Area, Page 208. The statement “*currently there is a shift back to a groundfish-based fishery (Fig. 4.17).*” is not clear from figure referenced. It’s recommended to add other supporting literature.

4.8. Data Gaps, Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. As the BMAs will not be fallowed simultaneously, a discussion of potential overall cumulative organic deposition and chemical persistence should be included especially in light of the lack of data on salinity and currents.

6.0. Effects of the Environment on the Project, Page 352. Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

7.0. Effects of the Project on the Environment, Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects. Please provide further detail.

7.0. Effects of the Project on the Environment, Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included. Indirect genetic effects and ecological interactions with wild Atlantic Salmon should also be discussed.

7.0. Effects of the Project on the Environment, Page 369. Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of ‘acceptable’ organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Section 7.1.2.6 Sea Cage Sites (p. 370). Please provide thresholds to be used if known.

7.7. Accidents and Malfunctions, Page 435. *“Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.”* This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify.

Wild Atlantic Salmon Component Study, Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018).

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid). The document cites improved triploidy induction method but data is not provided nor does it appear to be published. Sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Please clarify.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report. The ocean current time-series used for this study are too short to provide statistically robust estimates of dispersion. Previous studies done in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance of low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Other time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012).

Fish and Fish Habitat Component Study, Page 28. *“The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track.”* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Fish and Fish Habitat Component Study, Page 36. *“In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay.”* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *“Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important.”*

Fish and Fish Habitat Component Study, Page 63. *A more recent paper by Ma et al. (2017) on surge in the Study Area should be referenced and discussed.*

Bieger, Tilman

From: Bieger, Tilman
Sent: July-31-18 5:15 PM
To: Griffiths, Helen
Subject: RE: Grieg

Thanks Helen sounds good

We believe these risks can be mitigated and managed – but they need to be properly described and characterised in the doc

From: Griffiths, Helen
Sent: July-31-18 2:57 PM
To: Bieger, Tilman
Subject: Grieg

Spoke to Bret and Shelley

They're revisiting comments, and focus is on:

- Genetic integrity
- Triploids
- Comment on nets being escape proof (wasn't sure if we should focus on that or not.....)
- Impacts of escapes on wild pop
- Any DFO comments that have been misconstrued or are inaccurate

Will have something back tomorrow

Will suggest Friday am or pm meeting with province on this. She was hoping for this week

Bieger, Tilman

From: Bieger, Tilman
Sent: July-31-18 6:06 PM
To: Lubar, John
Subject: FW: URGENT INFORMAL: Grieg EIS

John we should probably be keeping you in the loop on some of the main issues on the Grieg proposal.

See below our response to a request from PMO triggered by our recent comments on the EIS for the project.

From: Pike, Kelly J
Sent: July-31-18 11:55 AM
To: Butcher, Ashley
Cc: Perry, Jacqueline; Butler, Annette; Bieger, Tilman; Griffiths, Helen; Kahn, Zoe; Jarjour, Jasmine; Malko, Carol; Khwaja, Saba; Finn, Ray
Subject: FW: URGENT INFORMAL: Grieg EIS

Ashley, as requested please see information below as approved by Jacqueline Perry, RDG-NL Region.

If you need anything further please let me know.

Kelly
On Behalf of Annette Butler

From: Perry, Jacqueline
Sent: Tuesday, July 31, 2018 11:47 AM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>; Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: RE: URGENT INFORMAL: Grieg EIS

Approved

From: Bieger, Tilman
Sent: Tuesday, July 31, 2018 11:30 AM
To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: RE: URGENT INFORMAL: Grieg EIS
Importance: High

Hello Jackie, Annette

Please let me know if this needs to be condensed.

Tilman

- DFO is participating in the Committee established by the Province of NL to review the Environmental Impact Statement (EIS) for the aquaculture project proposed by Grieg NL in Placentia Bay. A key role of that committee is to pronounce on the “acceptability” of the EIS.
- To inform the advice we provided to the Committee, the Department held a scientific review process involving some 10 DFO scientists in the NL Region in June 2018. This review identified a number of areas in which the EIS did not adequately or properly characterize the environment and potential risks of the project, particularly in terms of the possible impacts of escaped farm salmon on wild salmon stocks.
- Based on this scientific advice, the Department recommended to the Committee on July 12 some 90 instances in which the EIS should be modified by providing clarification or additional information.
- In subsequent meetings it was determined that a number of these instances could be resolved during the post-EA regulatory process. There are however a number of recommendations remaining that need to be addressed in order for the Department to accept that the EIS properly describes the potential impacts of the project. Addressing these recommendations would not require the proponent to carry out any additional studies or research – they could all be addressed by the proponent incorporating or referencing existing information.
- It is our understanding that in order for Grieg NL to provide this additional information, the Province would have to declare the EIS deficient, which would trigger an additional 50-day review period. There have been assertions that this would unnecessarily delay the project start.
- We understand that some other regulatory authorities and some stakeholder groups have expressed concerns about some of the same elements in the EIS that we have.
- The Department is not fundamentally opposed to the project, and believes it could proceed, provided that appropriate mitigations and monitoring are implemented. However, to support evidence based decision-making by the Province and to protect our credibility, it is important that our advice to the Province incorporate and address key recommendations from our scientific review.
- Regional DFO personnel will continue to work closely with officials of the Province of NL and the representatives of Grieg NL to clarify and prioritise the information that is needed to ensure the EIS meets an acceptable standard of scientific rigour. The actual number of key issues to be clarified will likely be significantly less than the 90 initially identified.

From: Butler, Annette
Sent: Monday, July 30, 2018 8:43 PM
To: Bieger, Tilman; Finn, Ray
Cc: Pike, Kelly J; Perry, Jacqueline
Subject: Fw: URGENT INFORMAL: Grieg EIS

Hi Tilman,

Can you please draft a response to this request for RDG approval.

DUE RDGO: ASAP

Thank you,

Annette

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butcher, Ashley <Ashley.Butcher@dfo-mpo.gc.ca>
Sent: Monday, July 30, 2018 8:41 PM
To: Butler, Annette
Cc: Kahn, Zoe; Jarjour, Jasmine; Malko, Carol; Khwaja, Saba
Subject: URGENT INFORMAL: Grieg EIS

Hi Annette -

MINO received an inquiry from PMO, who had been contacted by the province of NL on this issue. They're looking for information from the Department before noon, Tuesday:

An inquiry from the province was received asking what additional information DFO requires for the Grieg EIS and potential impacts on wild salmon? Could the Department please provide more information on this?

Thanks!

Ashley

Bieger, Tilman

From: Bieger, Tilman
Sent: July-31-18 9:09 PM
To: Hendry, Christopher
Cc: Griffiths, Helen; Pike, Kelly J
Subject: Re: Tomorrow

Yes sorry I got that wrong, Helen's mtg w Province is Thursday.

Sent from my BlackBerry 10 smartphone on the Bell network.

Original Message
From: Hendry, Christopher
Sent: Tuesday, July 31, 2018 8:26 PM
To: Bieger, Tilman
Cc: Griffiths, Helen; Pike, Kelly J
Subject: RE: Tomorrow

Provincial holiday tomorrow for Regatta Day?

From: Bieger, Tilman
Sent: July 31, 2018 7:02 PM
To: Hendry, Christopher
Cc: Griffiths, Helen; Pike, Kelly J
Subject: Re: Tomorrow

OK
I copied Helen in off chance she needs to contact you in prep for mtg with Province tomorrow afternoon on Grieg.

Sent from my BlackBerry 10 smartphone on the Bell network.
Original Message
From: Hendry, Christopher
Sent: Tuesday, July 31, 2018 6:42 PM
To: Bieger, Tilman
Subject: Tomorrow

Tilman,  Email me if you need anything.

s.19(1)

Pilgrim, Bret

From: Pilgrim, Bret
Sent: August-01-18 3:40 PM
To: Griffiths, Helen
Subject: Provincial Comment validation - BBP.docx
Attachments: Provincial Comment validation - BBP.docx

Categories: Red Category

As discussed.

Bret

**Pages 1488 to / à 1501
are duplicates of
sont des duplicatas des
pages 1088 to / à 1101**

Decker, Shelley

From: Griffiths, Helen
Sent: Wednesday, August 1, 2018 3:42 PM
To: Pilgrim, Bret; Decker, Shelley
Subject: FW: Meeting Thursday

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: August-01-18 3:29 PM
To: Griffiths, Helen; Bieger, Tilman
Cc: Squires, Susan
Subject: RE: Meeting Thursday

Ok thanks Helen. I'll meet you and Tilman at the visitor's entrance of the Confederation Building East Block a few minutes before 1:00pm tomorrow.

Regards,

Joanne
709.729.2822

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Wednesday, August 1, 2018 1:01 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>; Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>
Subject: RE: Meeting Thursday

We should be good to go tomorrow pm.

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: July-31-18 4:32 PM
To: Griffiths, Helen; Bieger, Tilman
Cc: Squires, Susan
Subject: Meeting Thursday

Hi Helen and Tilman,

I just sent you a meeting request for Thursday afternoon. The request may be a little premature, but it was the only way to secure a boardroom. Let me know sometime tomorrow if Thursday afternoon works.

Regards,

Joanne
709.729.2822

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"This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender."

No information has been removed or severed from this page

Pilgrim, Bret

From: Pilgrim, Bret
Sent: August-02-18 11:49 AM
To: Decker, Shelley
Subject: EA comments _DFO EIS review (2).doc
Attachments: EA comments _DFO EIS review (2).doc

Categories: Red Category

As discussed

Triploid

1. **Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon.** Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided. (See EIS 2.5.2.2 pg 95-96, and appendix I, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner). - **Potentially addressed in the referenced sections -BBP**
2. **Page 12.** Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Please provide detailed methodology for testing to demonstrate 100% effectiveness. Please see the EIS, section 2.5.2.2 pg 95-96, and **appendix I**, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner). - **Potentially addressed in the referenced sections -BBP**
3. **Page 17.** The Executive Summary (p. xxxix) states that "*triploid female salmon do not enter freshwater.*" However, it states here that "*the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes.*" Revisit, provide references and clarify for consistency. (On pg 17 the Cotter and Fjellidal studies show triploids (male and female) are less likely to migrate to freshwater and attempt to spawn than diploids. The Cotter et al. study indicates female triploid Atlantic salmon do not exhibit sexual maturation or spawning behaviour. Greg is inferring in the executive summary that sterile triploid females will not mature (sexually) or possess a desire to migrate to freshwater, as stated on pg 17. Please advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner) - **Potentially addressed in the referenced sections -BBP**

Escapees

4. **Page xxxiv.** Based on the figures provided, the statement that "*the proposed cage sites are more than 50 km from the majority of scheduled rivers*" is confusing as most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them and how these distances were calculated. This issue needs to be clarified throughout the document ensuring to include known unscheduled salmon rivers as presented in Table 1 below. (Please see the Wild Atlantic Salmon Component Study, section 4.4, pg 15-17, and advise whether additional information is required by DFO to make a recommendation as to whether the project may proceed in an environmentally acceptable manner) - **Potentially addressed in the referenced sections -BBP**
5. **Page 45.** Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, please provide the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. (Would this validate/discredit the performance of the Aqualine Midgard net? This information was not required by the EIS guidelines.) - **Proponent needs to reword statement**
6. **Page 435.** "*Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.*" This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify. (Please review pgs 7, 8 and 11 of the Wild Atlantic Salmon Component Study and advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner). - **Ecological Interactions are not discussed, with the exception of competition for food - BBP.**
7. **Page 354.** There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance. (Please review section 7.7 pg 431 and tables 7.20 – 7.22 and advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner). - **Agreed – little to no details on the effects of the environment/fish and fish habitat - BBP**

8. **Page 372.** There is no mention of potential escapes of farmed fish as an effect of the project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects. . (Please review section 7.71 pg 431 and tables 7.20 – 7.22 and advise whether DFO requires additional information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner) - **Potentially addressed in the referenced sections -BBP**
9. **Page 481.** It is unlikely that the residual effects would be “not significant”. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc) should be discussed in more detail. (Please review pgs 7, 8 and 11 of the Wild Atlantic Salmon Component Study and advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner) **Ecological Interactions are not discussed, with the exception of competition for food. - BBP.**
- 10.
11. **Page 174.** Migratory Patterns. Remove reference to Atlantic Salmon spending ‘several months’ in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater in Newfoundland systems. (This information may be provided to the proponent in a potential letter of release, should that be the course of action taken) – **Proponent to revise incorrect information**

DFO Reference Correction

12. Several times in the document there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: *“Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions”*. Please clarify. (To be referred to proponent for response. Please advise whether DFO requires this clarification to make a recommendation as to whether the project may proceed in an environmentally acceptable manner).
13. **Page 107.** The EIS states *“In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene”*. The statement is incorrect. Security breaches should be handled by the RCMP. (This could be included as advice to the proponent in a potential letter of release, should that be the recommended action)
14. **Page 352.** Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed. (To be referred to proponent for response. Please advise whether DFO requires this information to make a recommendation as to whether the project may proceed in an environmentally acceptable manner)

Component Study: Fish and Fish Habitat

- **Page 14.** The first paragraph has misreferenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Johnson, Roger

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Thursday, August 2, 2018 1:30 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Johnson, Roger
Cc: Griffiths, Helen; Squires, Susan
Subject: deadline for MAE minister's EIS decision

Hi All,

As you're aware by now, additional time is needed to complete the EIS review and the deadline for the minister's decision is being extended. At this time I don't have the new deadline date, but I'll let you know once I've received that information.

Call or email me if you have any questions or concerns.

Regards,

Joanne
709.729.2822

"This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender."

Bieger, Tilman

From: Bieger, Tilman
Sent: August-03-18 11:11 AM
To: Griffiths, Helen
Subject: FW: URGENT INFORMAL: Grieg EIS

fyi

From: Bieger, Tilman
Sent: August-02-18 2:28 PM
To: Perry, Jacqueline
Cc: Butler, Annette
Subject: RE: URGENT INFORMAL: Grieg EIS

Jackie based on further discussions with provincial EA officials and analysis of the EIS (by FPP) it appears many of our "concerns" about information in the Grieg EIS may be less significant than what I was led to understand and communicated.

Helen and her group are scheduled to meet with the EA Committee Chair on Tuesday coming discuss again our remaining concerns and how they can be addressed.

Supporters of the project of course would prefer to avoid triggering the requirement for of an addendum (~50 days to prepare and review) if at all possible.

FYI the Province is extending the deadline for their Minister's decision on this – it was July 31 but new deadline tbd.

From: Perry, Jacqueline
Sent: July-31-18 11:47 AM
To: Bieger, Tilman; Butler, Annette
Cc: Pike, Kelly J; Griffiths, Helen
Subject: RE: URGENT INFORMAL: Grieg EIS

Approved

From: Bieger, Tilman
Sent: Tuesday, July 31, 2018 11:30 AM
To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: RE: URGENT INFORMAL: Grieg EIS
Importance: High

Hello Jackie, Annette

Please let me know if this needs to be condensed.

Tilman

- DFO is participating in the Committee established by the Province of NL to review the Environmental Impact Statement (EIS) for the aquaculture project proposed by Grieg NL in Placentia Bay. A key role of that committee is to pronounce on the “acceptability” of the EIS.
- To inform the advice we provided to the Committee, the Department held a scientific review process involving some 10 DFO scientists in the NL Region in June 2018. This review identified a number of areas in which the EIS did not adequately or properly characterize the environment and potential risks of the project, particularly in terms of the possible impacts of escaped farm salmon on wild salmon stocks.
- Based on this scientific advice, the Department recommended to the Committee on July 12 some 90 instances in which the EIS should be modified by providing clarification or additional information.
- In subsequent meetings it was determined that a number of these instances could be resolved during the post-EA regulatory process. There are however a number of recommendations remaining that need to be addressed in order for the Department to accept that the EIS properly describes the potential impacts of the project. Addressing these recommendations would not require the proponent to carry out any additional studies or research – they could all be addressed by the proponent incorporating or referencing existing information.
- It is our understanding that in order for Grieg NL to provide this additional information, the Province would have to declare the EIS deficient, which would trigger an additional 50-day review period. There have been assertions that this would unnecessarily delay the project start.
- We understand that some other regulatory authorities and some stakeholder groups have expressed concerns about some of the same elements in the EIS that we have.
- The Department is not fundamentally opposed to the project, and believes it could proceed, provided that appropriate mitigations and monitoring are implemented. However, to support evidence based decision-making by the Province and to protect our credibility, it is important that our advice to the Province incorporate and address key recommendations from our scientific review.
- Regional DFO personnel will continue to work closely with officials of the Province of NL and the representatives of Grieg NL to clarify and prioritise the information that is needed to ensure the EIS meets an acceptable standard of scientific rigour. The actual number of key issues to be clarified will likely be significantly less than the 90 initially identified.

From: Butler, Annette
Sent: July-30-18 9:40 PM
To: Bieger, Tilman
Subject: Re: URGENT INFORMAL: Grieg EIS

Hi Tilman,

From: Butler, Annette
Sent: Monday, July 30, 2018 8:43 PM
To: Bieger, Tilman; Finn, Ray
Cc: Pike, Kelly J; Perry, Jacqueline
Subject: Fw: URGENT INFORMAL: Grieg EIS

Hi Tilman,

Can you please draft a response to this request for RDG approval.

DUE RDGO: ASAP

Thank you,

Annette

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butcher, Ashley <Ashley.Butcher@dfo-mpo.gc.ca>
Sent: Monday, July 30, 2018 8:41 PM
To: Butler, Annette
Cc: Kahn, Zoe; Jarjour, Jasmine; Malko, Carol; Khwaja, Saba
Subject: URGENT INFORMAL: Grieg EIS

Hi Annette -

MINO received an inquiry from PMO, who had been contacted by the province of NL on this issue. They're looking for information from the Department before noon, Tuesday:

An inquiry from the province was received asking what additional information DFO requires for the Grieg EIS and potential impacts on wild salmon? Could the Department please provide more information on this?

Thanks!

Ashley

Pilgrim, Bret

From: Pilgrim, Bret
Sent: August-03-18 12:09 PM
To: Griffiths, Helen
Subject: Greig

Categories: Red Category

Helen,

We have completed our review of the provincial response as to how to best address DFO comments (e.g. COR, EEP, EEMP, Addendum...) I'm ready to have another quick chat about Greig at your convenience.

Bret

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562

Bieger, Tilman

From: Bieger, Tilman
Sent: August-06-18 11:11 AM
To: Johnson, Roger
Subject: Re: Grieg meeting

I think we can manage, Helen and Bret been working on this. Thx

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger
Sent: Monday, August 6, 2018 10:54 AM
To: Bieger, Tilman
Subject: Grieg meeting

Will be around Bay

Do you need me?

Sent from my BlackBerry 10 smartphone on the Bell network.

Bieger, Tilman

From: Bieger, Tilman
Sent: August-06-18 3:08 PM
To: Perry, Jacqueline
Subject: Re: Meeting with OCI and Grieg

OK

Helen is meeting from 1-4 tomorrow with provincial EA people to discuss our comments

I sent you a message late last week that based on further review over past week our concerns appear less likely to demand additional information (ie an addendum to the EA) than I advised previously.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Perry, Jacqueline
Sent: Monday, August 6, 2018 3:00 PM
To: Bieger, Tilman
Cc: Butler, Annette
Subject: Re: Meeting with OCI and Grieg

Will be just you and meeting with  from Grieg.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman
Sent: Monday, August 6, 2018 11:55 AM
To: Perry, Jacqueline
Subject: Re: Meeting with OCI and Grieg

Ok no problem to adapt from my perspective

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Perry, Jacqueline
Sent: Monday, August 6, 2018 11:34 AM
To: Bieger, Tilman; Butler, Annette
Cc: Butler, Annette
Subject: Re: Meeting with OCI and Grieg

I think will likely be just you and me. OCI expressing concern with list of invitees. I am working on that.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman
Sent: Monday, August 6, 2018 11:19 AM
To: Butler, Annette
Cc: Perry, Jacqueline
Subject: Re: Meeting with OCI and Grieg

s.19(1)

Roger  so I have taken liberty to extend invitation to Helen Griffiths.

Not sure she is able to attend though as she is meeting Tuesday with provincial EA officials on this issue.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Perry, Jacqueline
Sent: Monday, August 6, 2018 10:44 AM
To: Butler, Annette
Cc: Bieger, Tilman; Grant, Carole
Subject: Meeting with OCI and Grieg

Annette,

[REDACTED] contacted me asking for a meeting tomorrow on DFO input into Grieg EA. Please set up a meeting for 2pm and include Tilman, Roger if he is around and Carole Grant.

Thanks.
Jackie

Sent from my BlackBerry 10 smartphone on the Bell network.

s.19(1)

Bieger, Tilman

From: Bieger, Tilman
Sent: August-07-18 8:56 AM
To: Griffiths, Helen
Subject: RE: Meeting with OCI and Grieg

Yes pls drop up

Susan Squires just called me

From: Griffiths, Helen
Sent: August-07-18 8:55 AM
To: Bieger, Tilman
Subject: RE: Meeting with OCI and Grieg

Can we meet around 930 or 10 to discuss revised comments? thanks

From: Bieger, Tilman
Sent: August-06-18 2:33 PM
To: Griffiths, Helen
Subject: Re: Meeting with OCI and Grieg

OK thx Helen. Looks like they want to reduce number of participants so u may not be needed anyway.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Monday, August 6, 2018 2:19 PM
To: Bieger, Tilman
Subject: Re: Meeting with OCI and Grieg

Yes, scheduled to met with them 1-4 pm, although I don't think it will take that long.
I have to discuss comments with you in the morning.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman
Sent: Monday, August 6, 2018 11:20 AM
To: Griffiths, Helen
Subject: Fw: Meeting with OCI and Grieg

Fyi

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Sent: Monday, August 6, 2018 11:19 AM
To: Butler, Annette
Cc: Perry, Jacqueline
Subject: Re: Meeting with OCI and Grieg

Roger [REDACTED] so I have taken liberty to extend invitation to Helen Griffiths.

Not sure she is able to attend though as she is meeting Tuesday with provincial EA officials on this issue.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Perry, Jacqueline

Sent: Monday, August 6, 2018 10:44 AM

To: Butler, Annette

Cc: Bieger, Tilman; Grant, Carole

Subject: Meeting with OCI and Grieg

Annette,

[REDACTED] contacted me asking for a meeting tomorrow on DFO input into Grieg EA. Please set up a meeting for 2pm and include Tilman, Roger if he is around and Carole Grant.

Thanks.

Jackie

Sent from my BlackBerry 10 smartphone on the Bell network.

s.19(1)

Bieger, Tilman

From: Bieger, Tilman
Sent: August-07-18 9:24 AM
To: Butler, Annette
Cc: Pike, Kelly J
Subject: RE: Bilat with ADM AE

I recommend we update on the escape of farm salmon at Hermitage

And also on our input to the Grieg project

Jackie is up to speed on both of these but we can provide some text if needed.

From: Butler, Annette
Sent: August-07-18 9:03 AM
To: Bieger, Tilman
Cc: Pike, Kelly J
Subject: Bilat with ADM AE

Good morning Tilman,

Jackie's bilat with Philippe Morel is today at 1:00 pm – do you have any items for discussion?

Thanks,

Annette

Decker, Shelley

From: Griffiths, Helen
Sent: Tuesday, August 7, 2018 10:52 AM
To: Pilgrim, Bret; Decker, Shelley
Subject: FW: Provincial Comment validation - BBP.docx

Not sure I sent this

From: Hendry, Christopher
Sent: August-02-18 10:20 AM
To: Griffiths, Helen
Cc: Bieger, Tilman
Subject: RE: Provincial Comment validation - BBP.docx

The only relevance of AAR in the attachment would be the effects of the project on the environment. Specifically, under the escapees section, the effects of the Project on fish and fish habitat. The AAR permits deposition of regulated drugs, regulated pesticides, and BOD matter under normal operation of an aquaculture facility.

BASELINE

Under AAR, oceanographic information is to be collected onsite to provide a predicted depositional contour prior to any aquaculture activity 3000 days prior to any deposition. That is, to say, before any stocking of fish. Additionally, baseline assessment of substrate types and benthic flora/fauna is required. All this information, in this case, will be needed during the subsequent provincially-led site licensing processes for each of the proposed 11 cage sites in Placentia Bay.

OPERATIONAL

At the end of production cycles, follow-up monitoring is required to determine changes in oxic condition of the benthos after peak biomass, or when the maximum amount of fish of largest size would have been onsite, requiring the most feed, therefore maximum BOD deposition. If changes assessed at this time exceed acceptable thresholds, an operator would be prohibited to further deposit (i.e., restock site) until they demonstrate they are once again below the threshold.

Under the AAR, operators must use drugs or pesticides as directed by provincial health authorities, and only products authorized by Health Canada, CFIA, and/ or other relevant authorities. If products used outside of said operation, this would contravene the Reg under the *Fisheries Act* and enforcement actions would be taken.

There is also provision in the AAR to follow up on any morbidity/mortality seen outside salmon cages (i.e., non-target organisms). If there is such a report, a triage is undertaken by the Department to determine if the cause of morbidity/mortality is due to operation of the aquaculture site or an external factor.

REPORTING

Companies are required to provide at least 72h notification to DFO of drug and pesticide treatments for each site

Companies are required to provide annual reports to DFO of all deposits onsite for each calendar year for each site

Companies harvesting fish in a given year must provide the aforementioned peak biomass benthic monitoring for each site

From: Griffiths, Helen
Sent: August-01-18 4:17 PM
To: Hendry, Christopher
Cc: Bieger, Tilman
Subject: FW: Provincial Comment validation - BBP.docx

Hey Chris

Can you review attached in the context of AAR, specifically, ".....to examine/gather any monitoring requirements specified in the AAR and AAR Monitoring standard, with reference to:

- baseline and follow-up monitoring of water quality, sediment, drug and pesticide, BOD in the area of the sea cages and any reference site(s)
- monitoring during fallow periods (i.e. media, parameters, frequency)
- reporting of monitoring results
- climate in sea cage areas (water currents, waves, wind, water temperature)

Can I get this by mid-morning tomorrow please? I have a meeting with province at 1pm, so will need to discuss this aspect as well.

Thanks
Helen

From: Pilgrim, Bret
Sent: August-01-18 3:40 PM
To: Griffiths, Helen
Subject: Provincial Comment validation - BBP.docx

As discussed.

Bret

Pilgrim, Bret

From: Pilgrim, Bret
Sent: August-08-18 10:03 AM
To: Griffiths, Helen
Subject: RE: EIS comments

Categories: Red Category

No prob

From: Griffiths, Helen
Sent: August-08-18 9:55 AM
To: Decker, Shelley; Pilgrim, Bret
Subject: EIS comments

Hi
based on yesterday's meeting, can you prepare a brief letter indicating our new set of comments, i.e. ecological interactions and no recognition/acknowledgement of the magnitude of the potential effects if a lot of salmon were to escape.

Prob start off with something like based on further discussion with the province and further review by DFO, additional information should be provided to explain/acknowledge the ecological interactions.....

Also include that we are comfortable with some of our comments being addressed through other avenues, the COR, release letter, EPP, etc

By end of day please ☺

Thanks
Helen

Pilgrim, Bret

From: Pilgrim, Bret
Sent: August-08-18 1:20 PM
To: Griffiths, Helen
Subject: FW: DFO - Province Letter (DRAFT) Aug 8.doc
Attachments: DFO - Province Letter (DRAFT) Aug 8.doc

Categories: Red Category

Helen,
Please see the attached draft letter. The text in red will require your special attention as to how you would like to proceed. If there are any questions or require edits, please let me know.

Bret



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

August 9, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project*

I thank you for the opportunity to meet with you and your officials this week to follow up on recent correspondence in relation to the comments our Department provided on the Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Our Department is in agreement with addressing some of our outstanding comments, specifically those discussed during our meeting, in conditions the Province would stipulate or require for this project including Conditions of Release, Environmental Protection Plan and an Environmental Effects Monitoring Plan.

However, based on further review by DFO and discussions with provincial officials, the Department is of the opinion that the EIS has not adequately addressed or acknowledged potential ecological interactions and/or impacts of the project, notably those relating to escapement of farm fish, on commercial and non-commercial fisheries, including wild Atlantic Salmon, within Placentia Bay. We defer the decision as to how this deficiency will be addressed to the Provincial EA Committee.

If you have any further questions or comments with respect to the above you can contact me by phone (709.772.4088) or email (Helen.Griffiths@dfo-mpo.gc.ca).

Sincerely,

Helen Griffiths
A/Manager, Fisheries Protection – Regulatory Review
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Pilgrim, Bret

From: Pilgrim, Bret
Sent: August-09-18 1:05 PM
To: Griffiths, Helen
Attachments: EA review_DFO comments_03 Aug BBP for meeting Aug 7.docx

Categories: Red Category

Are talking about the attached document? Or actual notes (minutes) taken at the meeting?

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562

DFO EIS Review

Suggested means to Address Comments (original by Province – revised by FPP)

Potential COR

2.5. Monitoring and Mitigation Measures, Page 100. *“A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project...”*. These data would be highly valuable to industry regulators and should be made available.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan, Page 31. It states that “if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented.” This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals.

Potential EPP

2.5. Monitoring and Mitigation Measures, Pg 92: What are the contents of an escape response kit?

Accidents and Malfunctions, pg 123: Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear. Please revisit and discuss interaction with lost gear.

Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles. The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same applies to Table 7.12 and 7.13.

Potential EEMP

Section 7.8. Follow-up Monitoring, Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Wild Atlantic Salmon Component Study, Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Potential Advice in release letter/ attachment

Section 2.5. Monitoring and Mitigation Measures, Page 107. The EIS states *“In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene”*. The statement is incorrect. Security breaches should be handled by the RCMP.

Several times in the document there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: "*Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions*". Please clarify.

Wild Atlantic Salmon Component Study, Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized. Consult with DFO prior to finalizing a recapture plan.

Wild Atlantic Salmon Component Study, Page 32. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Potential Addendum

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater in Newfoundland systems.

Page 354. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

7.0. Effects of the Project on the Environment, Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included.

7.7. Accidents and Malfunctions, Page 435. "*Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.*" This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). Please clarify.

Page 480. It is unlikely that the residual effects would be "not significant". Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) should be discussed in more detail.

Decker, Shelley

From: Decker, Shelley
Sent: Friday, August 10, 2018 9:04 AM
To: Griffiths, Helen; Pilgrim, Bret
Subject: RE: CSAS review of Grieg
Attachments: Science - Grieg PB Aquaculture EIS SRR - June 28.docx

Here you go. It's saved on the shared drive:

F:\5. Regulatory Review\RRU - Mining\Aquaculture\DFO Branch Comments

Shelley

From: Griffiths, Helen
Sent: Friday, August 10, 2018 8:57 AM
To: Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: CSAS review of Grieg

Hi
Either of you have e-copy of the CSAS report? I cant find my copy/email

**Pages 1528 to / à 1552
are duplicates of
sont des duplicatas des
pages 863 to / à 887**

Page 1553
is a duplicate of
est un duplicata de la
page 887

Bieger, Tilman

From: Bieger, Tilman
Sent: August-10-18 9:54 AM
To: Griffiths, Helen
Subject: RE: DFO letter - Grieg Aquaculture EIS

Thanks Helen

Thinking we would normally send this as a signed and scanned doc?

From: Griffiths, Helen
Sent: August-10-18 9:24 AM
To: Squires, Susan
Cc: Bieger, Tilman
Subject: DFO letter - Grieg Aquaculture EIS

Hi Susan
Please see attached.
Any questions, give me a call.

Helen
772-4088

Decker, Shelley

From: Pilgrim, Bret
Sent: Friday, August 10, 2018 10:09 AM
To: Decker, Shelley
Subject: FW: DFO letter - Grieg Aquaculture EIS
Attachments: DFO - Province Letter Aug 10.doc

PATH SAPH NO: 16-HNFL-00041

A little PATH practice.

You can upload this letter into the PATH file (see PATH number on letter) when you get a chance. Remember you can upload this through your email or you can open the PATH file, create a new action log item, upload the document and copy/paste the email. We can run through this.

From: Griffiths, Helen
Sent: August-10-18 9:28 AM
To: Pilgrim, Bret; Decker, Shelley
Subject: FW: DFO letter - Grieg Aquaculture EIS

For our records

From: Griffiths, Helen
Sent: August-10-18 9:24 AM
To: Squires, Susan
Cc: Bieger, Tilman
Subject: DFO letter - Grieg Aquaculture EIS

Hi Susan
Please see attached.
Any questions, give me a call.

Helen
772-4088



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

August 10, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project*

Thank you for the opportunities to engage with you and your officials over the past week on comments our Department has provided on the Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

In light of further detailed review by DFO personnel and discussions with your officials, we consider now that almost all of the issues we identified as needing to be addressed in our letter of July 27, 2018 could be satisfactorily addressed in conditions the Province could stipulate or require for this project. We plan to provide you with the notes discussed at our last meeting.

We remain of the view that additional information should be provided about the potential ecological impacts (such as through predation or competition) that an escape of a large number of farm salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic Salmon. We defer to the EA Committee and officials of your department to decide if and how this should be achieved.

If you have any further questions or comments with respect to the above you can contact me by phone (709.772.4088) or email (Helen.Griffiths@dfo-mpo.gc.ca).

Sincerely,

Helen Griffiths
A/Manager, Fisheries Protection – Regulatory Review
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Griffiths, Helen

From: Pilgrim, Bret
Sent: August-10-18 11:55 AM
To: Griffiths, Helen
Subject: FW: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Helen,
Please see Chris' response/information below. I was just speaking with Chris and he informed me that Mark Simpson would likely be the best person to talk to regarding Lumpfish as he was involved in a Lumpfish transfer risk assessment re aquaculture not long ago.

Bret

From: Hendry, Christopher
Sent: August-09-18 1:41 PM
To: Pilgrim, Bret
Subject: FW: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hi, Bret. I propose the following response. Will leave it to you to respond.

- Lumpfish from a native broodstock will be used to produce farmed lumpfish used as cleaner fish in the sea cages.
- Sea cages will be stocked with lumpfish once they reach 20–50 g (~5–10 months old) and harvest them 12–16 months later at 17–26 months of age prior to sexual maturity.
- As with any cage culture, there is a possibility of fish escaping.
- If escapes survive, though domestication suggests this is less likely, there is a possibility of interbreeding.
- The proposed use of a local (NL) strain is designed to mitigate interbreeding concerns, however the genetic diversity of NL lumpfish populations is not well understood.

From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: August-09-18 1:23 PM
To: Hendry, Christopher
Cc: Whelan, Dr. Daryl S; Squires, Susan
Subject: FW: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hi Chris,

I'm looking for some guidance on a question in the email below, which I incorrectly posed to Daryl, and he has referred me to you. Can you/DFO advise?

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

From: Whelan, Dr. Daryl S
Sent: Thursday, August 9, 2018 1:19 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Subject: Re: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hello Joanne. I would refer you to Chris Hendry at DFO for response.

Dr. Daryl Whelan
Chief Aquaculture Veterinarian
Director - Aquatic Animal Health Division
Fisheries and Land Resources
T: 709 729-6872
E: darylswhelelan@gov.nl.ca

From: Sweeney, Joanne
Sent: Thursday, August 9, 2018 12:20 PM
To: Whelan, Dr. Daryl S
Cc: Squires, Susan
Subject: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hi Daryl,

Would you provide a response to the following public concern, which refers the potential effects of escaped sea cage lumpfish on wild lumpfish:

"The result of non-significant effects is based on incorrect assumptions:
lumpfish could mature in the wild and interbreed with wild lumpfish."

Specifically, is there potential for escaped (sea cage) juvenile lumpfish to mature in the wild and interbreed with wild lumpfish?

Further to this, page 438 of the EIS (Main Text) states the following, as a mitigation measure:

"The use of Newfoundland broodstock lumpfish as cleaner fish in the sea cages avoids any genetic effect of breeding between cleaner fish and wild lumpfish"

Is this a true statement?

Your response is anticipated. Please call me at 729-2822 if you need clarification or wish to discuss.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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No information has been removed or severed from this page

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: August-10-18 2:39 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Griffiths, Helen; Squires, Susan
Subject: please review the attached and provide comments by noon on Monday, August 13, 2018
Attachments: draft EIS recommendation_10Aug18.docx; EA review_DFO Aug 10-2018.pdf; DFO - Province Letter Aug 10-2018.pdf

Good Afternoon,

I've received final EIS review comments from DFO (attached) and have summarized all EAC review comments in the attached draft EIS recommendation, which includes a suggested path forward for after each comment. Please review and provide your comments to me by noon on Monday, August, 13, 2018.

Feel free to call me if you have any questions or wish to discuss.

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

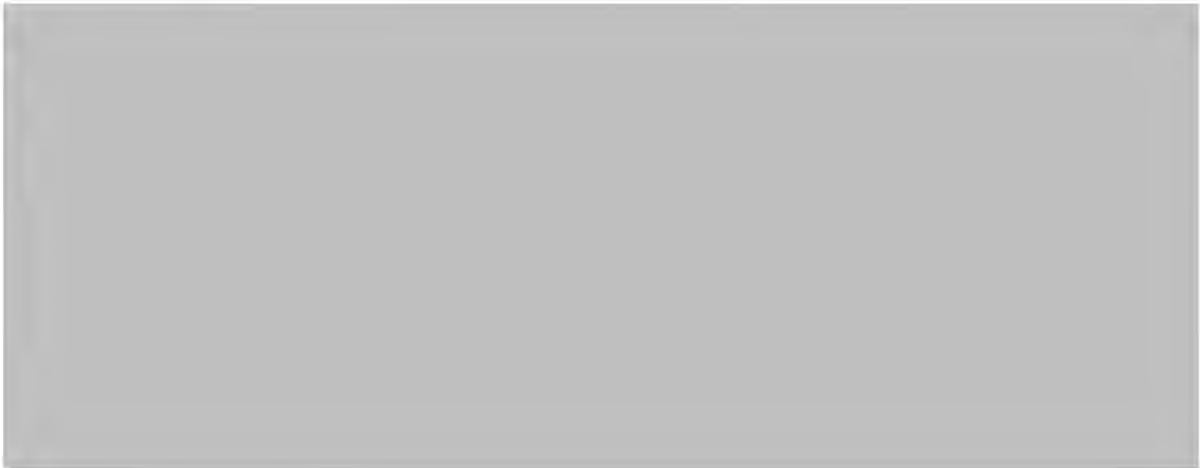
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Draft EIS Recommendation
Placentia Bay Atlantic Salmon Aquaculture Project

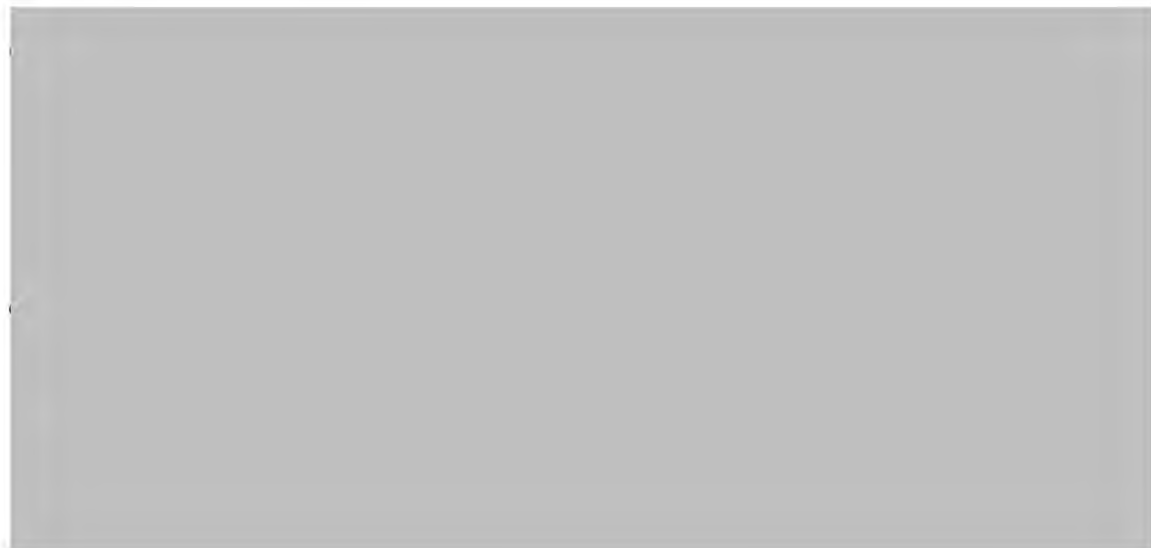
The EAC comments pertaining to the EIS review for the above noted project have been summarized below, and will help formulate the EAC recommendation to be provided to the Minister of Municipal Affairs and Environment regarding the acceptability of the EIS. Two potential paths forward are indicated after many of the comments. Please review and **provide a response to me by noon on Monday, August 13, 2018**, as to whether:

- a. the EIS review comments provided by your government department/ division are satisfactorily represented;
- b. your government department/division has any objection to recommending either of the indicated paths forward, for any comment noted below.

Pollution Prevention Division

A large rectangular area that has been redacted, appearing as a solid grey block. This is likely where the Pollution Prevention Division's response to the EIS review comments would be provided.

Water Resources Management Division

A large rectangular area that has been redacted, appearing as a solid grey block. This is likely where the Water Resources Management Division's response to the EIS review comments would be provided.

Health Canada

- Prior to the administration of any pesticide, drug or disinfectant, the company should confirm that these substances are still approved for the specific use intended. If disposal is required, the company should dispose of any pesticide, drug or disinfectant in a manner such that adverse impacts to human health or the environment are minimized. (Included in #1 above).
- The proponent shall provide Standard Operating Procedures for sea cage sites to Health Canada for approval prior to project commencement, which affirm that the procedures are designed to minimize and/or eliminate the potential risks to human health via consumption of farmed salmon and/or non-target organisms as a result of the use and/or disposal of chemicals and disinfectants during operations.

Path forward: condition of release or addendum

Transport Canada

- A portion of the project occurs in federal government waters, and the project is subject to the approval of Transport Canada under the Canada Shipping Act. Any measures necessary to mitigate the direct effects of the project on navigation will be included as terms and conditions associated with the work approved or permitted pursuant to the Navigation Protection Act.

Path forward: condition of release or addendum

- Vessels should be compliant with all *Canada Shipping Act, 2001* requirements for inspection, which include certification of the vessel and adequate training and appropriate certificate of competency for the operators.

Path forward: information to be provided to the proponent

- Ensure that all vessels will have procedures in place to ensure safeguards against marine pollution: awareness training of all employees, means of retention of waste oil on board and discharge to shore based reception facilities, capacity of responding to and clean-up of accidental spill caused by vessels involved in any particular project.

Path forward: information to be provided to the proponent

Environment and Climate Change Canada

- ECCC provides both general and specific project-related information and mitigative and permitting advice to the proponent, and advises the proponent to determine the potential applicability of the Canadian Environmental Protection Act 1999 (CEPA) with regard to the chemicals it plans to use in their aquaculture operations.

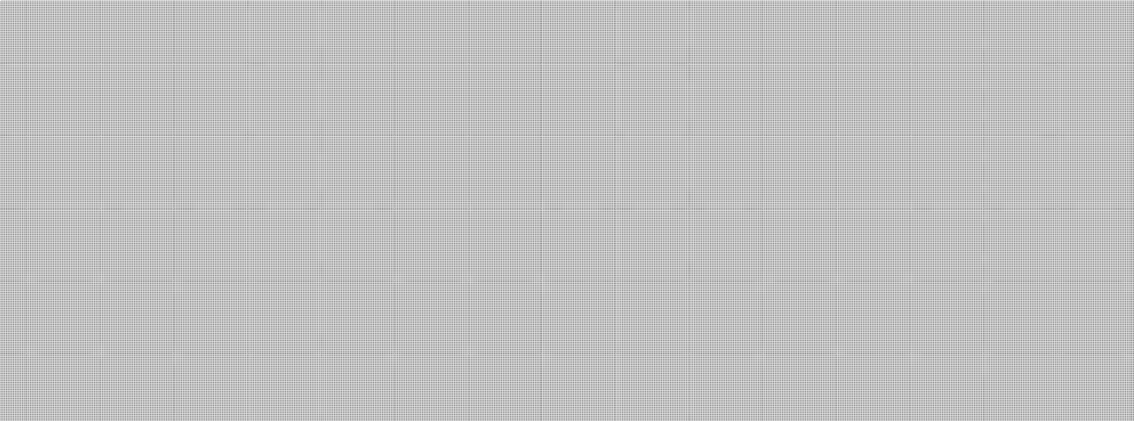
Path forward: information to be provided to the proponent

Tourism, Culture, Industry and Innovation

- Indicates that the EIS responds to the concerns identified by tourism stakeholders, primarily in the outfitting sector, about the potential risks associated with escapes, recapture plans, sea lice control, introducing a new strain of salmon and potential impacts on wild Atlantic salmon.

s.13(1)(c)

Fisheries and Land Resources

- 
-

Fisheries and Oceans Canada

- The proponent shall collaborate, by sharing recapture gear, or entering into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented in the event of a farmed salmon escape. This written commitment shall be provided to Fisheries and Oceans Canada prior to the commencement of project construction.

Path forward: condition of release or addendum

- What are the contents of an escape response kit? (Note: the contents are listed in the EIS Appendix T on page 32 and appear to comply with the minimum gear requirements of Schedule 1 of the Code of Containment.)
- The EIS outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear.
Path forward: to be included in an environmental protection plan (EPP)

- The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away.
Path forward: to be included in an environmental protection plan (EPP)
- Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should monitor effects due to disease and pathogens, sea lice, and ecological interactions. (Note: it is unclear how a proponent would monitor the above-noted effects, i.e., verify that a farmed fish is the source of a pathogen found in a wild fish or salmon near a sea cage. It may not be a desirable practice to encourage a proponent to capture wild fish for examination and reporting of results. This appears to be an industry-wide issue which needs to be discussed amongst industry stakeholders, including DFO, FLR and aquaculture operators).
- There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc. (please see note above).
- The EIS states “In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene”. The statement is incorrect. Security breaches should be handled by the RCMP.
Path forward: information to be provided to the proponent
- Several times in the document there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO’s 2016 CSAS document. However, this document (CSAS 2016) does not state that DFO proposes such a distance. Instead, the exact wording is: “*Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions*”. (Note: Discussions between DFO and the EAC Chair and Director on August 7, 2018 resolved that there is no evidence to support that a specific separation distance of 20-30km between sea cages and the mouths of salmon rivers effectively mitigates the effects of sea cages on migrating salmon. DFO does not have a regulation or policy that requires/recommends a minimum separation distance between finfish sea cages and the mouths of rivers.
- It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized. Consult with DFO prior to finalizing a recapture plan.
Path forward: condition of release or addendum

- The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that ‘recapture nets will be checked four times daily while deployed’. Depending on time of year when recapture efforts occur, and if it’s deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Path forward: condition of release or addendum

- The reference to Atlantic salmon spending ‘several months’ in their natal freshwater habitat after hatching is incorrect. Wild Atlantic salmon spend at least two or more years in freshwater in Newfoundland systems.

Path forward: information to be provided to the proponent

Page 354. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

7.0. Effects of the Project on the Environment, Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included.

7.7. Accidents and Malfunctions, Page 435. *“Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon.”* This will not prevent the occurrence of ecological interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017).

Page 481. It is unlikely that the residual effects would be “not significant”. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) should be discussed in more detail.

The four comments immediately above, and all above-noted comments from DFO have been summarized in the attached letter from DFO, dated August 10, 2018. The letter indicates that almost all (EIS) issues identified as needing to be addressed in DFO’s letter of July 27, 2018 (also attached), could be satisfactorily addressed in conditions the Province could stipulate or require for the project. As noted in the August 10, 2018 letter, DFO remain of the view that additional information should be provided about the potential ecological impacts (such as predation or competition) that an escape of a large number of farm salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic salmon. DFO defers to the EA Committee and officials of the Department of Municipal Affairs and Environment to decide if and how this should be achieved.

DFO EIS Review

Suggested means to Address Comments (original by Province – revised by FPP)

Potential COR

2.5. Monitoring and Mitigation Measures, Page 100. *“A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project...”*. These data would be highly valuable to industry regulators and should be made available.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan, Page 31. It states that “if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented.” This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals.

Potential EPP

2.5. Monitoring and Mitigation Measures, Pg 92: What are the contents of an escape response kit?

Accidents and Malfunctions, pg 123: Table 7.7 in the VEC section outlines potential interactions with marine mammals and sea turtles from project activities but it doesn't specify the potential interaction of lost/estranged gear. Please revisit and discuss interaction with lost gear.

Section 7.3.3 & 7.3.4. Marine Mammals & Sea Turtles. The EIS discusses entanglements of marine mammals and sea turtles due to the presence of sea cages but again, only considers the operations (cages in place on a site) and not for cages/ropes/nets that have broken away. Please discuss in this context. The same applies to Table 7.12 and 7.13

Potential EEMP

Section 7.8. Follow-up Monitoring, Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Wild Atlantic Salmon Component Study, Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Potential Advice in release letter/ attachment

Section 2.5. Monitoring and Mitigation Measures, Page 107. The EIS states *“In the unlikely event of serious security breaches (such as vandalism or persons refusing to leave the site), Fisheries Officers from DFO will be contacted and respond to the scene”*. The statement is incorrect. Security breaches should be handled by the RCMP.

Several times in the document there is reference to a DFO-recommended distance between salmon cages and salmon river mouths of 20-30km, citing DFO's 2016 CSAS document. However, this document does not state that DFO proposes such a distance. Instead, the exact wording is: "*Farm-to-salmon river separation distance criteria of 20-30 km have at times been proposed as a measure to reduce wild-farmed salmon interactions*". Please clarify.

Wild Atlantic Salmon Component Study, Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized. Consult with DFO prior to finalizing a recapture plan.

Wild Atlantic Salmon Component Study, Page 32. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes. It also states that 'recapture nets will be checked four times daily while deployed'. Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater in Newfoundland systems.

Potential Addendum

Page 354. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

7.0. Effects of the Project on the Environment, Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages. A discussion of how this could increase mortality on migrating wild Atlantic Salmon smolts and adults should be included.

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Page 481. It is unlikely that the residual effects would be "not significant". Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) should be discussed in more detail.



P.O. Box 5667
St. John's, NL A1C 5X1

Your file Votre référence

August 10, 2018

Our file Notre référence
16-HNFL-00041

Susan Squires
Director - Environmental Assessment
Department of Municipal Affairs and Environment
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Squires:

Re: *Review of the Environmental Impact Statement of the Placentia Bay Atlantic Salmon Aquaculture Project*

Thank you for the opportunities to engage with you and your officials over the past week on comments our Department has provided on the Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

In light of further detailed review by DFO personnel and discussions with your officials, we consider now that almost all of the issues we identified as needing to be addressed in our letter of July 27, 2018 could be satisfactorily addressed in conditions the Province could stipulate or require for this project. We plan to provide you with the notes discussed at our last meeting.

We remain of the view that additional information should be provided about the potential ecological impacts (such as through predation or competition) that an escape of a large number of farm salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic Salmon. We defer to the EA Committee and officials of your department to decide if and how this should be achieved.

If you have any further questions or comments with respect to the above you can contact me by phone (709.772.4088) or email (Helen.Griffiths@dfo-mpo.gc.ca).

Sincerely,

Helen Griffiths
A/Manager, Fisheries Protection – Regulatory Review
Fisheries Protection Program
Ecosystems Management Branch
Fisheries and Oceans Canada

Bieger, Tilman

From: Bieger, Tilman
Sent: August-13-18 12:26 PM
To: Johnson, Roger
Subject: RE: DFO letter - Grieg Aquaculture EIS
Attachments: DFO - Province Letter Aug 10-2018.pdf

Just FYI

You probably have seen the attachment sent Friday past already - but emails below may be helpful too

From: Finn, Ray
Sent: August-10-18 2:11 PM
To: Bieger, Tilman; Griffiths, Helen
Cc: Perry, Jacqueline; Abbass, Lily
Subject: Re: DFO letter - Grieg Aquaculture EIS

Thanks Tilman and Helen

Recall that some time ago the GOC decided no federal EA was needed in recognition of the mature and effective regulatory regime in NL. This was a decision made by Min McKenna.

Helen's letter to the Province re iterates this quite well.

Ray

s.16(2)(c)

s.19(1)

s.21(1)(b)

(cell)
(709) 772 - 2442. (office)

Sent via Blackberry

From: Bieger, Tilman
Sent: Friday, August 10, 2018 12:59 PM
To: Perry, Jacqueline; Abbass, Lily; Paquette, Michael
Cc: Finn, Ray; Johnson, Roger; Griffiths, Helen; Hawkins, Laurie; Lubar, John; Hendry, Christopher; Blanchard, Tony; Lambert, Robert
Subject: FW: DFO letter - Grieg Aquaculture EIS

After a number of meetings and discussions, we've gone back to the Province with refined (and hopefully final) advice on the Grieg EIS, see attached letter sent today.

The upshot is we now consider that issues we identified previously could be addressed through regulatory processes that would take place should the project proceed. This is aligned with decisions our Department made relating to the project in 2016.

We are continuing to state that more information could be provided on the potential ecological (non-genetic) effects of an escape of a large number of farm salmon. But we are leaving it to the Province to decide how that should be addressed.

Our personnel continue to work with the Province (through the EA committee and directly) to help them respond to or address comments they received on the EIS from other parties.

The Province has not announced any decision on the EIS (despite their July 30 deadline for doing so).

Available to discuss if needed.

From: Griffiths, Helen
Sent: August-10-18 10:03 AM
To: 'Squires, Susan'
Cc: Bieger, Tilman; Sweeney, Joanne
Subject: RE: DFO letter - Grieg Aquaculture EIS

See signed version.

From: Squires, Susan [mailto:SusanSquires@gov.nl.ca]
Sent: August-10-18 9:28 AM
To: Griffiths, Helen
Cc: Bieger, Tilman; Sweeney, Joanne
Subject: RE: DFO letter - Grieg Aquaculture EIS

Thank you Helen. We will review your letter and be in touch again should we have any further questions.

I certainly appreciate your efforts and the time you have given us to discuss and ask questions.

Kind regards,
Susan

Susan Squires, Ph.D.
Director
Environmental Assessment Division
Department of Municipal Affairs and Environment
Government of Newfoundland and Labrador
709-729-0673
susansquires@gov.nl.ca

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Friday, August 10, 2018 9:24 AM
To: Squires, Susan <SusanSquires@gov.nl.ca>
Cc: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Subject: DFO letter - Grieg Aquaculture EIS

Hi Susan
Please see attached.
Any questions, give me a call.

Helen
772-4088

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Decker, Shelley

From: Decker, Shelley
Sent: Monday, August 13, 2018 1:53 PM
To: Johnson, Roger
Cc: Pilgrim, Bret
Subject: Grieg MP Inquiry Form
Attachments: Grieg-MP-inquiryform-August 13, 2018.docx

Here you go. If you need any changes or anything further please let me know.

Shelley

From: Johnson, Roger
Sent: Monday, August 13, 2018 1:22 PM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: FW: Update

From: Pike, Kelly J
Sent: Monday, August 13, 2018 10:30 AM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>; Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Cc: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: RE: Update

Bret

Attached is an updated template/MP Inquiry form, which includes directives concerning Political Representative's Requests for information.

The form is also available at the following link: <http://intra.dfo-mpo.gc.ca/departement/templates/templates-eng.asp>

Any questions, please let me know.

Kelly

From: Bieger, Tilman
Sent: Monday, August 13, 2018 10:28 AM
To: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Cc: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>
Subject: FW: Update

Roger in Helen's absence could you pls work with Bret on this. Mtg is tomorrow so assume this is needed asap...

Kelly can provide the template

Thx

From: Perry, Jacqueline
Sent: August-13-18 10:20 AM
To: Bieger, Tilman
Cc: Pike, Kelly J; Dawe, Lana; Abbass, Lily; jacqueline.perry@mobile.gc.ca
Subject: FW: Update

Good morning Tilman,

Can you please prepare a MP Inquiry Form with a proposed response to MP Rogers office. I will forward them on to DMO/MINO for approval before we respond to Ms. Crann.

Let me know if you have any concerns.

Thank you,

Annette

From: Rogers, Churence - Assistant 1 [<mailto:Churence.Rogers.A1@parl.gc.ca>]
Sent: 2018-August-13 10:05 AM
To: Perry, Jacqueline
Subject: Update

Hello Jackie,

The MP and I are heading into a meeting with the MIN tomorrow and Churence wanted me to reach out to get your perspective on things with Grieg and where things stand with the project now? After your meeting with the proponent, what's the next steps?

If an email is too much, I'd appreciate a quick chat if you have a moment??

Many thanks,
Barb

Barbara Crann
Executive Assistant~
MP Churence Rogers
Bonavista-Burin-Trinity

s.19(1)



Directives Concerning Political Representatives' Requests for Information

1. Definitions:

Employee: Any of the Department's employees.

Factual information: Information accessible to the public (examples: available on a website, part of an issued press release, divulged by a departmental representative during a meeting with the industry or partners, providing this group is not told that the information is sensitive or confidential) and not constituting opinions or political orientations.

"Other" information: Any information that the public cannot access, that is sensitive, confidential, complex or for which a political or departmental decision must be made.

Department's authorized representative: An employee such as a program specialist who is authorized to speak on behalf of the Department or who holds the position of Director.

Representative of senior management: Regional Directors General and Assistant Commissioners or at a higher level.

Political representative: A member of Parliament, a senator, a member of a province's or territory's legislative assembly, a municipality's elected official, or their designated representative(s).

2. Processing of political representatives' requests:

2.1 Summary:

The Department is committed to respond to political representatives' requests in a timely manner. Political representatives' questions are answered by the *Department's authorized representatives* or by a *representative of senior management*. Upon receiving a question from a political representative, an employee who is not an authorized representative of the Department must quickly transmit the question to an authorized representative of the Department. Any exchange of information with a political representative must be communicated to the senior management's office (Assistant Commissioner, Regional Director General or higher) the Deputy's Office and to the Minister's Office.

When a political representative's request is of interest to other sectors or regions, these sectors or regions should be consulted. In addition, the Member of Parliament Inquiry Form must be forwarded to these sectors or regions for information purposes.

Attention should be given to providing personal information to an MP, consistent with the Privacy Act, which allows for the disclosure of personal information to an MP for the purpose of assisting the individual to whom the information relates in resolving a problem.



2.2 Obligation of the employee who receives a request for factual or political information or a request for a meeting:

When a political representative contacts an employee, the employee must:

2.2.1 If the request is made by telephone:

The employee must immediately make note of the request. The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

The employee should call the political representative back within 1 working day to communicate the name of the Department's authorized representative, or of senior management's representative if necessary, who will be responsible for responding to the request, if a response could not be given during the call.

2.2.2 If the request is sent via email:

The employee must acknowledge within 1 working day that the request has been received.

If it is possible and does not delay the sending of an acknowledgement message, the acknowledgement message should include the name of the Department's authorized representative, or of the representative of senior management if necessary, and the latter should receive a copy of an acknowledgement message via email.

The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

2.3 Processing requests for factual information:

Summary: Requests for factual information will receive a response within 2 working days from program directors or specialists, meaning the Department's authorized representatives.

Requests for factual information transmitted by an employee or received directly by the authorized representative of the Department must receive a response no more than 2 working days after the Department has received the request.

When the political representative's request requires the provision of factual or "other" information, the authorized representative of the Department can immediately provide the factual information and indicate that the "other" questions (of a sensitive, confidential or political nature) will be answered once the appropriate stakeholders have been consulted.

The authorized representative of the Department must complete the Member of Parliament Inquiry Form and forward it to the office of the appropriate senior management representative (RDG, AC or ADM), sending a copy to the executive assistant, no more than 1 working day after the factual information has been shared with the political representative.

The office of senior management's representative will then forward the form to the Ministerial Liaison Office and to the Deputy Minister's office no more than four (4) hours after it was



received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office.

2.4 Processing requests for "other" information:

Summary: Requests for "other" information (sensitive, complex, requiring the taking of a political position, confidential) will receive a response within 96 hours (four working days) from senior management's representatives (regional directors general and assistant commissioners or at a higher level). Within 2 working days of receiving a request, the Minister's Office will receive, for approval, the questions asked and suggested responses. After receiving approval for suggested responses, the member of senior management will contact the political representative.

Supported by recommendations from program directors and specialists, senior management's representative will submit, within 2 working days, the questions asked by the political representative and proposed response using the MP Inquiry Form to the Deputy Minister's office and the Ministerial Liaison Office. The Ministerial Liaison Office is responsible for forwarding the questions and the response guidelines to the Minister's Office.

The Minister's Office, through the Ministerial Liaison Office or directly, must authorize senior management's representative to transmit responses to the political representative.

Once the Minister's Office has authorized the transmission of responses, senior management's representative must give the information to the political representative within 2 working days.

In general, the political representative's responses can be provided within 96 hours (four working days) of receiving the request.

Within 1 working day, senior management's representative (or their office) will confirm with the Deputy's Office and the Ministerial Liaison Office that the information has been shared with the political representative.



2.5 Request for meetings from political representatives:

Summary: Requests for meetings with political representatives (federal, provincial, municipal) will be accepted (or declined) within 2 working days of the request. Within 1 working day, the Minister's Office will be informed of the request, for comment. Following the meeting, a summary, noting any action items, will be provided to the Minister's Office (via the Ministerial Liaison Office).

When receiving requests for meetings with political representatives, clarify, to the extent possible, details of the meeting (e.g. items to be discussed, timing considerations and participants [e.g. for an event, other participants?]).

Within four hours, notify the RDG, AC or ADM, copying the executive assistant, that a meeting has been requested by a political representative via the Member of Parliament Inquiry Form. Include relevant information (e.g. subject, timing, etc.) and recommendation to meet.

The office of the RDG, AC or ADM will endorse the recommendation (accept or decline) and forward it to the Ministerial Liaison Office, which is responsible for sending it to the Minister's Office, and to the Deputy Minister's Office. If, in the opinion of the Deputy's Office or the Minister's Office, there is an issue, the office of the RDG, AC or ADM will be advised of concerns (typically within one working day).

Within 2 working days of receiving the initial request, the authorized representative will accept or decline the Department's participation. The RDG, AC or ADM will authorize the name of the employee(s) who will participate in the meeting.

Within 1 working day of the meeting, the Department representative who met the political representative will provide a summary of the meeting, including any action items or follow up, to the RDG/AC/ADM office, with a copy to the executive assistant. The office of the RDG/AC/ADM will send the form to the Ministerial Liaison Office and to the Deputy Minister's Office no more than four hours after the form has been received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office (if relevant).

This approach applies for requests from federal, provincial, territorial and municipal elected officials, and their staff, and for senators. Meeting requests from foreign dignitaries are handled by Global Affairs Canada and this directive does not apply to such requests.



**MEMBER OF PARLIAMENT
INQUIRY FORM**

**DEMANDE DE RENSEIGNEMENTS
D'UN MEMBRE DU PARLEMENT**

Date: 13 August 2018

Member of Parliament:
Membre du parlement : Churence Rogers

Riding:
Circonscription : Bonavista-Burin-Trinity

Telephone No:
Nº. de téléphone :

Subject:
Objet : Placentia Bay Atlantic Salmon Aquaculture Project

**INQUIRY/ DEMANDE DE
RENSEIGNEMENTS:**

QUESTIONS:

Barbara Crann, Executive Assistant of Churence Rogers, MP, emailed with an inquiry to Jacqueline Perry, A/Regional Director, Fisheries Management regarding Fisheries and Ocean's perspective on the environmental impact statement review for the Placentia Bay Atlantic Salmon Aquaculture Project and its current status. This inquiry was passed on to Helen Griffiths, A/Regional Manager – Regulatory Review, DFO Fisheries Protection Program.

Employee Name:
Nom de l'employé : Helen Griffiths

Position:
Poste : A/Regional Manager – Regulatory Review - FPP

Telephone No:
Nº. de téléphone :

**Sector or Region/Secteur
ou région**

**Approved by/Approuvé
par :**

Copy forwarded for
information to the



sector/office:
Copie acheminée pour
information au
secteur/bureau :

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: August-13-18 3:33 PM
To: Johnson, Roger; Pike, Kelly J
Subject: Re: Update

Can I get update on this?

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman
Sent: Monday, August 13, 2018 10:28 AM
To: Johnson, Roger
Cc: Griffiths, Helen; Pilgrim, Bret; Pike, Kelly J
Subject: FW: Update

Roger in Helen's absence could you pls work with Bret on this. Mtg is tomorrow so assume this is needed asap...

Kelly can provide the template

Thx

From: Perry, Jacqueline
Sent: August-13-18 10:20 AM
To: Bieger, Tilman
Cc: Pike, Kelly J; Dawe, Lana; Abbass, Lily; jacqueline.perry@mobile.gc.ca
Subject: FW: Update

Good morning Tilman,

Can you please prepare a MP Inquiry Form with a proposed response to MP Rogers office. I will forward them on to DMO/MINO for approval before we respond to Ms. Crann.

Let me know if you have any concerns.

Thank you,

Annette

From: Rogers, Churence - Assistant 1 [mailto:Churence.Rogers.A1@parl.gc.ca]
Sent: 2018-August-13 10:05 AM
To: Perry, Jacqueline
Subject: Update

s.19(1)

Hello Jackie,



The MP and I are heading into a meeting with the MIN tomorrow and Churence wanted me to reach out to get your perspective on things with Grieg and where things stand with the project now? After your meeting with the proponent, what's the next steps?

If an email is too much, I'd appreciate a quick chat if you have a moment??

Many thanks,
Barb

Barbara Crann
Executive Assistant~
MP Churence Rogers
Bonavista-Burin-Trinity



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Ecosystems and
Oceans Science

Sciences des écosystèmes
et des océans

Canadian Science Advisory Secretariat
Science Response 2018/nnn

Newfoundland and Labrador Region

REVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT

Context

The Proponent, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. (referred to as Grieg NL), proposes to build and operate a land-based Recirculating Aquaculture System (RAS) Hatchery for Atlantic Salmon (*Salmo salar*) in Marystown, Newfoundland and Labrador (NL), and marine-based farms (11 sea cage sites) located in the northern portion of Placentia Bay, NL. A phased approach will be used to ramp-up production of salmon.

Grieg NL is required through the provincial environmental assessment process to prepare an Environmental Impact Statement (EIS) for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. The EIS documents, including the Component Studies, were prepared pursuant to the NL *Environmental Protection Act* to comply with the EIS Guidelines prepared by representatives from Provincial and Federal government departments, including Fisheries and Oceans Canada. The purpose of the EIS is to identify and assess the significance of biophysical and socio-economic effects of the Project taking into consideration mitigation measures.

On May 30, 2018, the Fisheries Protection Program of the Ecosystems Management Branch in the NL Region of Fisheries and Oceans Canada (DFO) requested that Science undertake a review of specific sections of the EIS for the proposed Placentia Bay Atlantic Salmon Aquaculture Project. DFO Science undertook a Science Response Process for this review. The information from this scientific review will be provided to Ecosystems Management to help form part of the Department's response to the overall adequacy of the EIS documents.

The objective of this review was to evaluate:

- The sufficiency of baseline data and appropriateness of methodologies to predict effects;
- The mitigation measures proposed by the Proponent;
- The level of certainty in the conclusions reached by the Proponent on the effects;
- The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the Proponent's methodologies and conclusions);
- The follow-up program proposed by the Proponent; and
- Whether additional information is required from the Proponent to complete the technical review.

The information required for this review can be found in a number of sections throughout the EIS report, and associated Component Studies and Appendices. The EIS documents are available on the Government of NL's Department of Municipal Affairs and Environment [website](#).

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

This Science Response Report results from the Science Response Process of June 25, 2018 on the Review of the Environmental Impact Statement for the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Analysis and Response

The comments provided by DFO Science, NL Region are related to the following Sections of the EIS Reports:

- **Executive Summary**
- **Section 2.4 – Project Description**
 - Section 2.4.1 - Project Rationale
 - Section 2.4.3 - Land-based Facility (RAS hatchery)
 - Section 2.4.4 - Sea Farms
- **Section 2.5 – Monitoring and Mitigation Measures**
- **Section 2.7 – Alternatives**
- **Section 2.8 – Accidents and Malfunctions**
- **Section 3.0 – Effects Assessment Methodology**
- **Section 4.0 – Existing Environment**
- **Section 4.2 – Aquatic Existing Environment**
 - Section 4.2.2 - Physical Environment
 - Section 4.2.3 - Fish and Fish Habitat
 - Section 4.2.4 - Wild Atlantic Salmon
- **Section 4.8 – Data Gaps**
- **Section 6.0 – Effects of the Environment on the Project**
- **Section 7.0 – Effects of the Project on the Environment**
- **Section 7.1 – Fish and Fish Habitat Valued Environmental Component (VEC)**
- **Section 7.2 – Wild Salmon VEC**
- **Section 7.7 – Accidents and Malfunctions**
- **Section 7.8 – Follow-up Monitoring**
- **Section 7.9 – Assessment Summary and Conclusions**
 - Section 7.9.1.2 - Wild Salmon VEC
 - Section 7.9.2 - Accidents and Malfunctions
- **Section 8.1 – Summary of Mitigation Measures**
- **Component Study: Wild Atlantic Salmon and Appendices**
- **Component Study: Fish and Fish Habitat and Appendices**

General Comments

Overall, the EIS documents appear to be complete and the topics considered within the relevant sections are generally appropriate, although many references cited in the EIS are missing from the reference list. The elements of the report that focus on the technical basis of the EIS are well developed, clear and easy to interpret. However, the EIS is lacking in the sections dealing specifically with impacts on the local and broader environment. Additionally, the conclusions made throughout the document are not consistently supported by existing information.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

DFO Science's assessment of the risks associated with the proposed Project identified a long list of significant uncertainties. Despite significant and numerous knowledge gaps, the report consistently states that there is medium to high certainty of non-significant impacts. This is highly unlikely.

The EIS documents state that triploidy induction has been improved from the industry standard to 100%, and that a sample size of 10 eggs is all that is required to detect failures. This assumes both the success is indeed closer to 100% than previously reported in the literature, and the distribution of failures is non-normal such that small sample sizes are all that are needed. In the absence of published peer-reviewed work describing these findings or inclusion of the actual testing data this cannot be validated. Without validation the reported 98% success rate seems a more reasonable approximation (DFO 2016).

There is no evidence that testing for triploidy following delivery to Newfoundland will occur at multiple points prior to the release of these individuals to sea cages. Differential mortality of triploids is highly likely and could significantly magnify the proportion of diploids in these cages, dramatically increasing the direct genetic threat to wild salmon populations. Repeated testing and verification should be required.

The spatial and temporal variability needs to be considered when using the current information to run a deposition model. As such, the current data to be used to force the model should correspond to the same period as the planned season for high feeding. In addition to the fact that the time-series are too short, they were collected during the winter which does not correspond to the feeding period.

Executive Summary

Page xxix. Sea Cage Sites. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how avoidance of cross-contamination will be achieved as some of the proposed routes cross Bay Management Areas (BMAs), as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another as currently proposed. Additional information is required on mitigation measures to address biosecurity risks associated with the introduction and spread of biofouling invasive species.

Page xxx. Sea Cage Sites. The document states that all sea cages will be attended by a remotely operated vehicle (ROV) and operator in addition to a camera monitoring above and below the water surface. This seems to imply that each cage will be equipped with its own ROV and operator. Clarification is required on the frequency the cages will be monitored (e.g., monthly, daily) and whether the ROV will be shared between BMAs.

Page xxxi. Assessment Boundaries. The EIS states that the boundaries of the Study Area are the Placentia Bay Extension Ecologically and Biologically Significant Area (EBSA) and that this is considered the 'maximum extent' wherein potential effects could occur. Although the Environmental Assessment (EA) Committee determined it was reasonable to use this as the Study Area as this is where most adverse effects would be expected to occur, it was acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this area as salmon are a highly migratory species. Also, there is scientific evidence that wild salmon tagged within Placentia Bay move beyond the bay and non-local salmon have also been caught within the bay. Therefore, it seems inaccurate to state that the 'maximum extent' for impacts is the EBSA.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page xxxiv. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. Supporting documentation to demonstrate how 100% triploidy will be achieved needs to be provided and peer reviewed.

Page xxxiv. Based on the figures provided, the statement that the proposed cage sites are more than 50 km from the majority of scheduled rivers is false. In fact, most of the scheduled salmon rivers within Placentia Bay are less than 30 km from the proposed cage sites, and several of the proposed cage locations are at the mouths of known salmon rivers. Please provide a figure that shows all salmon rivers (scheduled and non-scheduled) in relation to location of proposed cage sites and report distance between them. It is important to note that farmed fish show up at DFO's counting fence every year on Garnish River even though the nearest aquaculture site is 40-50 km away, and release studies in Norway have reported farmed salmon occurring in rivers hundreds of kilometers from where fish have been released (Skilbrei 2010).

Page xxxiv. Control of Sea Lice. Please provide a detailed explanation of how proposed mitigation measures such as use of sea lice skirts, administering feed at depths of 6-7 m below the surface, use of formulated feed, etc. will help control sea lice.

Page xxxiv. Effects on Benthic Habitat. *"Proposed sea cage sites were selected based on sufficient current velocity and direction necessary to minimize depositional build-up from sea cages, adequate water depth for deployment of sea cages, and suitable bottom type (i.e., >50% hard bottom)."* The timeline of the currents data used in the study is much too short to determine dominant forcing (e.g. tide vs. wind) and variability and cannot be used with confidence to support the claim that most of the potential effects are "not significant" (see detailed comments re: Appendix A: Fish and Fish Habitat Component Study).

Page xxxiv. Effects on Benthic Habitat. Based on monitoring data collected over the past 10-12 years, it is known that organic wastes (excess feed, feces, and biofoulants) accumulate underneath cages and surrounding areas even if DFO siting criteria (suitable currents, depths and hard bottoms) are adhered to and this deposition remained beyond the one year mandatory fallow period, which was implemented by the Province at that time.

Page xxxv. Fish and Fish Habitat VEC. The document states that there will be cessation of feeding at ~80% satiation. It is assumed this means that the operators will stop administering feed to the salmon once ~80% satiation is reached. This is very subjective and would require constant monitoring of the fish behaviours.

Page xxxvi. Wild Atlantic Salmon VEC. Please provide a reference for the Placentia Bay salmon abundance estimate or describe how this estimate was derived.

Page xxxvi. Studies exist for migratory movements on south coast (see Reddin and Lear 1990, Pippy 1982). These should be included and discussed.

Page xxxvii. In the first paragraph, it states that effects are expected *"to be minor, localized and relatively short-term."* This is not known and the statement does not reflect the large amount of uncertainty. The concluding statement that residual effects were predicted to be not significant is overly optimistic and does not reflect the high level of uncertainty, particularly when the level of confidence is rated as medium to high.

Page xxxvii. Species at Risk VEC. There is no mention of the footprint that will be caused by deposition of organic wastes. Please revisit and provide this information.

Page xxxviii. Sensitive Areas VEC. It is assumed that the medium-term effects would be the accumulation of organic wastes underneath the cages, which will occur despite implementation of the various mitigation measures listed. Clarification is requested.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page xxxix. Accidents and Malfunctions. Please provide references to support the statement that triploid female salmon do not enter freshwater.

Page xxxix. Follow-up Monitoring. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered freshwater. Follow-up monitoring should be determined in consultation with DFO.

Page xli. Summary of Component Studies. Follow-up monitoring does not minimize potential effects. This section should use similar wording as used for the Fish and Fish Habitat Component Study (i.e., mitigation measures intended to minimize the potential effects of the proposed Project on fish and fish habitat and the follow-up monitoring intended to validate the effects conclusions in the EIS).

Section 2.4 Project Description

2.4.1 - Project Rationale

Page 12. Triploids would alleviate most of the concerns associated with direct genetic impacts on wild salmon populations. Recent information suggests that current methodology results in about 98% of the fish being sterile, although on p.17 it states that there will be 100% sterility. Demonstration of 100% triploidy induction is not practical given the requirement to test every individual and the destructive nature of verification methods at embryo-larval stages (DFO 2016). Sterility estimates should be based on careful experimental design and accurately reflect the proportion of sterility based on representative samples. To date, details needed to evaluate these protocols and estimates have not been provided.

Examples are provided whereby small and large companies are transitioning to the use of sterile triploid salmon. While operating revenues are shown, information pertaining to what proportion of farmed salmon production comes from triploids versus diploids for each of these example companies, would provide a better context. In general, how much of the production of farmed salmon in Norway (or Scotland, or Ireland) is now derived from use of triploids?

The document suggests that better nutrition and more optimal growing conditions have alleviated past disadvantages associated with use of triploids, namely reduced or irregular growth, lower survival, increased deformities, suppressed immune system resulting in increased susceptibility to diseases. Thorstad et al. (2008) reported that experiments carried out to evaluate commercial culture of triploids in the Bay of Fundy region were terminated when triploids were found to be highly susceptible to infectious salmon anaemia (ISA).

Page. 14. *"Despite some previous commercial concerns surrounding the use of triploid versus diploid Atlantic Salmon, recent research and industry results show that triploid Atlantic Salmon perform equal or better than diploid salmon."* This is encouraging, but until triploids are fully investigated in Newfoundland (Placentia Bay), there is no evidence as to whether similar results would occur and hence a cautious approach should begin with a series of pilot studies to evaluate this fully. Accordingly, the sentence on p.17 stating that: *"In the sea, its performance is equal if not better than diploid salmon in cold environments such as Placentia Bay"* is premature. Benfey (2016) has recently noted that triploids tend to perform less well than diploids and their resistance to diseases is still uncertain. Also, while the study is now somewhat dated, triploid Rainbow Trout were not found to perform better than diploids at Bay d'Espoir (Pepper et al. 2003).

Page 16. *"Hansen et al. (2015) also compared performance of diploid and triploid Atlantic Salmon at various temperatures and reduced oxygen concentration (70% O₂ saturation). No*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

difference was observed between the diploid and triploid groups with regard to length and weight measurements, but triploids had significantly higher mortality at 70% O₂ saturation compared to diploids. Hansen et al. (2015) concluded that triploid Atlantic Salmon were negatively impacted on important production parameters (feed intake, mortality, etc.) when cultured at high seawater temperatures (19°C) and this was compounded when oxygen saturation levels were lower (70% saturation). In conclusion, triploid Atlantic Salmon are more suited to culture in areas that have temperature profiles that are moderate in the summer months and not subject to periods of low oxygen saturation (hypoxia). The dissolved oxygen (DO) values to define potential hypoxic conditions for triploids should be 7.0 ppm, based on current literature data and as stated above. The document reports that the proposed sites in the Rushoon BMA have DO values near or below 7.0 ppm at all depths sampled (see Table 4.11) with no fish at present. This is a concern and use of these sites should be reevaluated.

Page 16. *"Likewise, the oxygen concentration of Placentia Bay over the 2016 and 2017 sampling period indicates that hypoxia should not be a concern."* As stated previously, this may not apply to all BMAs.

Page 17. The Executive Summary (p. xxxix) states that *"triploid female salmon do not enter freshwater."* However, it states here that *"the propensity for triploid Atlantic Salmon to migrate into freshwater following an escape is significantly lower than for diploid Atlantic Salmon escapes."* Revisit and clarify for consistency.

Page 21. It would be helpful to label any scheduled rivers on these maps (Figs. 2.4, 2.5, 2.6) to illustrate proximity to sea cage sites/sea cages.

2.4.3 - Land-based Facility (RAS hatchery)

Page 29. The percentage of the eyed eggs that will be tested and certified for diseases, sterility and all-female prior to being shipped to NL, should be provided here. Testing for sterility should be conducted at multiple time points throughout the production cycle, and most importantly, just before introduction into sea cages.

2.4.4 – Sea Farms

Page 45. Promoting the Aqualine Midgard nets as escape-proof may be a strong statement as accidents may occur. While a number of clients were identified as using these cages, it would be helpful to know the relative production of farmed salmon originating from the Aqualine nets versus other conventional nets in places like Norway, Scotland, and Ireland. As there are still thousands of escapees reported from Norway, Ireland, and Scotland each year, this would suggest these nets are not commonly used by industry.

Page 45. It states that Grieg NL may also use sea lice skirts to assist in controlling sea lice. Skirts work by allowing the exchange of water while keeping parasites (sea lice) out. While they have worked well in some areas (e.g. Scotland), other studies have found that using skirts resulted in low oxygen levels in cages (Stien et al. 2012). Skirts would not be recommended in areas of low oxygen.

Page 52. Regarding the statement that service vessels will assist with net changing, further information is required on whether nets will be routinely changed. If so, how frequently or under what conditions, or is it only in the event that a net is damaged via predation or storm conditions? Please revisit and elaborate.

Page 53. *"Typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes."* This suggests that all nets are

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

replaced approximately every year. Additional detail is requested on net replacement and maintenance.

Page 64. *"If a transfer of fish between sea cages is required for any reason, a response/corrective action will be developed as per the established Standard Operating Procedures (SOP). This would likely involve the use of well boats."* Please clarify under what circumstances a transfer between sea cages would be required and also if there is a requirement/commitment to use well boats for this purpose, as Grieg NL are proposing to use well boats for all fish transfers. Otherwise this may result in a higher risk of escapes, which would need to be discussed in the EIS.

Page 68. Although it is promising to see new initiatives being explored such as the use of cleaner fish for sea lice control, use of Lumpfish may result in additional problems. Published reports (Powell et al. 2017) have shown that it is commonly the smaller, younger Lumpfish that will feed on sea lice. Also, other studies show that only about 30% of the Lumpfish placed in cages may actively feed. Additional details are required on the use of Lumpfish (e.g. size and non-feeding Lumpfish protocols, and transfer of pathogens/diseases from Lumpfish to salmon).

The stock origin of the Lumpfish (cleaner fish) is not clear. This is relevant specifically as a consequence of a potential breach in the cages and subsequent inadvertent escapes of salmon and Lumpfish come into play.

It is expected that sea lice will continue to be a problem both for farmed fish in cages, and most likely for wild salmon in areas proximate to cage sites. As noted previously, sea lice are a major threat to wild salmon in Norway.

Page 73. *"Environmental changes and plankton levels are rated and depending on the results various mitigation responses will be initiated."* Please provide a detailed explanation of these mitigation responses.

Page 75. Transfer of Fish from Sea Cage to a Processing Plant. The transfer process creates a risk in terms of potential for mortality and/or escapes and information on mitigation measures in case of accident/equipment failure, etc. is discussed briefly in the escapee section. Additional information should be provided regarding SOPs used during this process.

Page 76. *"The crew change sites will have specific areas for embarkation to and disembarkation from the proposed sea cage sites, which is designed to avoid cross-contamination."* It is unclear how cross-contamination will be avoided as some of the proposed routes cross BMAs as shown in Figures 2.52 and 2.53. Specific areas for embarkation/disembarkation within a given BMA are not sufficient as pathogens could be present in a given BMA and then transmitted to another BMA. Relatedly, on page 98: *"Service vessels (and the associated movement of equipment, supplies and waste) will not use the Petit Forte or Long Harbour stations. The use of separate resupply sites is designed to avoid contamination."* However, the Proponent will use routes crossing BMAs, as shown in Figure 2.53, thereby not mitigating risk of cross-contamination.

Section 2.5 – Monitoring and Mitigation Measures,

General Comment: Given that the companion text in Section 7.1 does not provide documented evidence of the expected area of influence during Operations and Maintenance, information is lacking to determine if the proposed mitigation measures are appropriate. Some of this research is presented in the Fish and Fish Habitat Component Study, but the pertinent details should be presented within the main document.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 91. Inspections. The document states that nets that are over three years old and still in use will be tested every 18 months by a third party, however, on p.53, it states that *'typically once a year, Grieg NL will employ the services of a larger multi-purpose service vessel to assist with operations such as net changes.'* Please revisit and clarify for consistency.

Page 92. Other Mitigation Measures. What are the contents of an escape response kit?

Page 96. Genetic Integrity and Biological Fitness of Wild Atlantic Salmon. The statement: *"The majority of scheduled rivers are located more than 50 km away from the proposed sea cage sites"* is not factual as many of the proposed cage sites are less than 30 km from scheduled rivers and some are actually located at the mouths of known salmon rivers (even though they are non-scheduled). The following non-scheduled rivers (Table 1) have been overlooked in the EIS.

Table 1. Non-scheduled salmon rivers near proposed cage sites.

River Name	Latitude	Longitude
Fair Haven Brook	47.541050	-53.891667
Little Barasway Brook	47.180000	-54.035700
Cuslett Brook	46.959817	-54.157450
Lance River*	46.819000	-54.067333
Branch River**	46.886883	-53.967317

*At tip of peninsula next to St. Mary's Bay

**In St. Mary's Bay

Page 99. *"Grieg NL will be using a sea cage net which extends 45 m below the water surface. This relatively deep net has sufficient volume to allow fish to swim to depths that will allow it to avoid unsuitable surface conditions (e.g., water temperature, sea lice, and waves) and thereby decrease stress on the fish."* While true for surface waves, this will not necessarily mitigate potential effects of internal waves that may be present at the sites. A reference to this potential effect on fish health should be given with data collected at sites during the stratified seasons (spring to fall) to determine whether this may be an issue.

Page 99. The statement: *"In addition, the grow-out plan is that fish will only spend one winter at sea; this minimizes the risk of fish mortality"* is unclear as only one intense winter could be problematic. A recent example is the superchill event in 2014, which significantly impacted the industry in nearby Fortune Bay and Bay d'Espoir. A more rigorous analysis of past winter sea temperature variability should be provided to properly assess the risk. For example, are temperatures expected to rise in Placentia Bay? Are any spatial variations to be expected? What are the current expectations with respect to climate change for the (Newfoundland Shelf) region?

Page 100. *"A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project. In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. In addition, sensors can be attached to cameras and buoys located at the perimeter of each sea cage site. These in-situ loggers will collect data on water temperature, oxygen levels, current speed and direction, as well as pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections. Plankton samples will be completed weekly, analyzed and levels recorded. This will be one of the information sources used to create net cleaning schedules. Data collection will be used to evaluate the severity of any environmental issues*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

such as fouling or changes in physio chemical data, leading to a response. Environmental changes and plankton levels are rated and depending on the results various mitigation responses are initiated. These data would be highly valuable to industry regulators and should be made available. Consultation and cooperation between the Proponent and regulators to develop appropriate SOPs to ensure data quality is recommended.

Page 101. The use of Aqualine nets and triploids will not prevent the incidence of, and the potential transfer of diseases among farmed salmon, and possibly to wild Atlantic Salmon. The Canadian Food Inspection Agency (CFIA) [website](#) indicates the following ISA events reported for Newfoundland: 2012 - three; 2014 - four; 2017 – two; and 2018 – two. In some of these instances, the virus strain was not known to cause disease. However, it should be expected that ISA and perhaps other diseases, resulting in mass mortality events, will continue.

Section 2.7 – Alternatives

Page 111. Alternatives Within the Project. There is reference to Bay St. George and the Codroy Valley area as an alternate location. However, Bay St. George should be protected from any development owing to the unique contribution of multi-sea-winter (MSW) salmon in these rivers.

Section 2.8 – Accidents and Malfunctions

Page 124. Table 2.25. The interpretation of the probability and impact of escapees to the environment lacks detail and seems optimistic that there would be little to no problems.

Section 3.0 – Effects Assessment Methodology

Page 130. Project Area. Potential for runoff from the Marine Industrial Park due to a tank rupture was not included in the evaluation of the project area. This should be revisited.

Page 130. Study Area. It states that *“The boundaries of the Study Area correspond to those of the Placentia Bay Extension EBSA”* and that *“This is considered the maximum extent wherein there is potential for effects of the Project to occur...”* Although the EA Committee determined it was reasonable to use this as the Study Area, as this is where most adverse effects would be expected to occur, it should be acknowledged that some effects, particularly disease transfer and transfer of parasites, could occur outside this Study Area as salmon are a highly migratory species (Reddin and Lear 1990, Pippy 1982).

Section 4.0 - Existing Environment

Page 139. Wind Speed and Direction. While the statistics presented are useful, persistence analyses should be added due to their importance with respect to structure resilience at sea. (e.g. duration of wind speed (storms) >10 m/s, 20 m/s) with the threshold to be determined upon structure tolerance. Wind direction variability (seasonality) is also not sufficiently documented (see detailed comments regarding Appendix D: Fish and Fish Habitat Component Study).

Page 140. Climate Change. More information should be provided regarding future change in storm frequency and intensity, as well as winter intensity that could occur based on latest available science (e.g. Cohen et al. 2014). These are of importance to aquaculture and would better inform risk factors.

Page 140. Wind rose(s) should be added to illustrate the statement *“The prevailing wind direction in Placentia Bay is a southwest to west flow throughout the year. During the winter, west to northwest winds are prevalent, with a counter-clockwise shift beginning in March and April resulting in predominant southwest winds during the summer.”* The sentence *“The tropical-*

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

to-polar temperature gradient strengthens during the fall, returning to prevailing westerly winds by late-fall and into the winter" is unclear. Please revisit and clarify.

Page 141. "A sea level rise of ~0.6 m is anticipated for the waters off southern Newfoundland, including Placentia Bay, by the 2081–2100 period." A reference should be provided for this statement.

Section 4.2 - Aquatic Existing Environment

General Comment: The topics presented and discussed are appropriate. However, the material provided within the sections is not adequately researched and inconsistent in the level of coverage within, and too generic with little effort made to incorporate local information or relate to the Study Area. In particular, in Section 4.2.3, Traditional Ecological Knowledge is largely unused (see Community-Based Coastal Resource Inventories in Newfoundland and Labrador). Also, for the components in which Grieg collected their own recent data, a literature review for other available data should be completed to better describe the spatial and temporal variability.

4.2.2-Physical Environment

Page 143. Ocean Currents. This section fails to describe the variability of the currents that has been observed and modelled, and which is considered to be the most important issue with respect to the physical environment assessment. In fact, the only coastal circulation modeling of the area, published by Ma et al. (2012) is not referenced. Appendix D (Fish and Fish Habitat Component Study) states: "*Since the variability due to tides accounts for approximately only 15% of the total variability, other factors are more important.*" This should be clearly stated in the main document as it implies a statistical variability of the currents much greater than that of the tides alone. For a system forced by tides only, most of the current variability could be represented with one month of data (i.e. spring and neap cycle in Newfoundland wind forcing and the Labrador Current are variable on timescales of days to seasons [or more]); thus implying the need for a longer time-series. Consequently, the data collected for this study which are 20 hours to seven days in duration, are not representative of the conditions experienced at any given site. This has significant implications for the modeling results presented in this section.

Page 144. Wind and Wave Action. Due to its nature the MSC50 dataset (note: the source/reference is missing from the text and should be added) is unlikely to be realistic for most of the sites of interest. MSC50 was based on a model initially developed for deep water (i.e. not coastal), is of insufficient resolution (0.1 degree for MSC06Min; that is about 10 km within Placentia Bay), and used a rather crude bathymetry and coastline (GEBCO and CHS 15s) which severely limits its applications in coastal areas. Wave climate might be under and/or over estimated at any given site and for any given season. Comparison with available data should be documented, limitations should be clearly stated, and a discussion on how this uncertainty is being mitigated should be provided.

Page 145. Flood and Tidal Zones. "*During storm events in September 2010 (Hurricane Igor) and January 2004, storm surges of ~0.03 m were observed at Argentia, resulting in a local sea level rise to 2.6 m as a result of the combined tidal and storm surge heights.*" A surge value of 0.93 m is reported on page 67 of Appendix D. Please revisit and provide the correct value.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

4.2.3-Fish and Fish Habitat

Page 154. Water Temperature. There are bay wide long-term data available from other sources that should be included in this assessment (see Bedford Institute of Oceanography's Oceanographic Databases; and DFO's Marine Environmental Data Section).

Page 154. Figures 4.6 and 4.7. Standard deviations to illustrate the variability should be provided in these figures.

Page 160. Corals and Sponges. This section does not make use of DFO research vessel incidental observations as referenced later in the document.

Page 160. Invasive Species. The document states that the primary Aquatic Invasive Species (AIS) concern in Placentia Bay is Green Crab. This is not correct. Although Green Crab are well known and well distributed in Placentia Bay, the primary concern for AIS is the presence of highly invasive tunicates, which are important/(economic and biological) biofouling species, specifically vase tunicate (*Ciona intestinalis*) and golden star tunicate (*Botryllus schlosseri*).

Vase tunicates are highly invasive and economically significant and have been found at both Marystown and Burin. The site of the hatchery and many of the support and supply vessels are from the Marystown area (and those not using this area may find AIS at other smaller harbours). The movement of this species is prohibited by the AIS regulations in the *Fisheries Act*. There are three major reasons for concern that are not addressed in the document:

1. Transport of invasive species (vase tunicate) by supply boats and other vessels (McKenzie et al. 2016). There is no mention of how this will be prevented. This is particularly important if the Proponent does not want to constantly clean their cages, and the weight alone of vase tunicate is a significant problem. More importantly, the Proponent will spread this species around Placentia Bay. It is important for the Proponent to have a plan to avoid spreading it throughout the bay on their vessel.
2. Regarding AIS and Biofouling, Grieg will monitor AIS and report to DFO. It is important to note that in addition to reporting, the Proponent will be responsible for the removal of the invasive tunicate. The Proponent received an experimental licence (2017) to monitor the proposed sites for AIS biofouling. It is not known where these data are or if they were collected, and it was not discussed in the report.
3. Although the document indicates cleaning the nets for biofouling, the Proponent cannot spray wash or clean the AIS species as they will spread in the water and infect other places. This is unacceptable and will cause a great deal more harm/cost for an aquaculture operation. Prevention is key but there are no references to prevent this introduction. This needs to be addressed.

Page 164. Regarding the text that successful restoration of eelgrass beds in Placentia Bay will be dependent on the removal or substantial reduction in Green Crab density, this information is available from studies performed in Placentia Bay (see Matheson et al. 2016).

Information is presented in this section regarding eelgrass restoration only. Eelgrass is considered an ecologically significant species (see DFO 2009; Rao et al. 2014), and information on existing eelgrass sites within the bay should be provided.

Page 166. There is no mention of the threatened designation for Lumpfish from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2017. This section should be revisited and updated to include a discussion in this regard.

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 170. Table 4.10. Subzero temperatures can be lethal to salmon. This section should indicate whether this is a concern.

Page 170. Benthic Habitat. This section only comments on habitat immediately near proposed sites. It would be helpful if habitat was discussed at a larger spatial scale using existing information. This is recommended in light of the lease sizes, the proximity of sites to Marine Protected Areas (MPAs), and the overall potential cumulative effect of deposition after stocking. More video data should be gathered to better describe depth related changes, considering the significant depth ranges at sites.

4.2.4-Wild Atlantic Salmon

Page 173. The EIS acknowledges the COSEWIC evaluation on the status of Atlantic Salmon whereby South Newfoundland was designated as "threatened." COSEWIC uses a standard approach where trends in abundance are examined over a period of 15 years or three generations. The authors of the COSEWIC report also indicated that with respect to south Newfoundland, had the analysis extended back one single year (i.e. over 16 years) south Newfoundland would have met the criteria to be designated as "Endangered." Several individual stocks in nearby Bay d'Espoir have declined by upwards of 80% (Conne River) and 90% (Little River) and represent the greatest salmon stock declines in NL. A retrospective analysis of salmon returns to Conne River for the years 1976-85 (10-years prior to start of the enumeration project) indicated that Conne River likely had strong returns of salmon similar to those that occurred during the first four years of the fish counting fence operation (1986-89) (Robertson et al. 2013). The recreational salmon fishery at Conne River used to be the third most important (in numbers of fish caught) on the island of Newfoundland (Warren and Dempson 1995). Historically, retained catch of salmon at Garnish River (Fortune Bay) was higher than total returns of salmon to the river in recent years at the fish counting fence (Moores et al. 1978). More discussion of historical and current studies should be provided.

Page 174. Migratory Patterns. Remove reference to Atlantic Salmon spending 'several months' in their natal freshwater habitat after hatching as they always spend at least two or more years in freshwater within Newfoundland systems.

Page 175. The document states "*Atlantic Salmon migratory corridors in Placentia Bay have not been identified in the literature*" yet some data exists which is not cited. While specific migratory corridors may not have been identified for the Placentia Bay area, past and current studies clearly indicate that Atlantic Salmon from other regions migrate along the south coast of Newfoundland. In the interception report by Pippy (1982), Maritimes and Quebec origin salmon made up 15% and 11% of the commercial catch of salmon in the Placentia Bay area and recently, genetic analyses of mixed stock fisheries for salmon at St. Pierre and Miquelon (Bradbury et al. 2016) similarly intercepted salmon originating from these other regions. Collectively, both historic and contemporary analyses show that salmon from other regions migrate by and into areas along the south coast of Newfoundland (see: Bradbury et al. 2016; Reddin and Lear 1990; Pippy 1982). Thus, any impacts associated with salmon aquaculture such as disease, parasites may also potentially impact salmon from areas well beyond Placentia Bay.

Page 175. Genetic Population Structure. The text should be updated to reflect that no diploid escapes were found in 2017 either.

Page 175. The genetic structure discussion requires more detail and is missing several references (see: Jeffrey et al. 2018, Bradbury et al. 2015). Placentia Bay is characterized by

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

small isolated regional populations of Atlantic Salmon, making them highly vulnerable to impacts.

Page 176. Abundance. It is noted that recreational fishery data for Placentia Bay are probably the best available indicator of salmon abundance within the Study Area. This is due to the lack of long-term salmon monitoring programs within the Study Area, with the exception of Northeast River, Placentia. The use of angling data, however, can be problematic. Stock assessments are not routinely carried out on rivers for which only recreational catch data are available. Reasons include: numerous changes to management plans over the years, use of daily and season bag limits, split seasons, angling quotas, the change to a licence stub return system and provision for catch and release besides the periodic closure of rivers for environmental reasons (Dempson et al. 2006). In a review of the use of angling data to infer status of populations, O'Connell (2003) concluded that the extrapolation of angling exploitation rates among rivers to determine stock size as used in relation to salmon assessments, for example those carried out by the International Council for the Exploration of the Sea (ICES), "*is potentially quite risky.*"

Section 4.8 – Data Gaps

Page 344. Fish and Fish Habitat. Data gaps exist regarding cumulative effects. The BMAs will not be fallowed simultaneously and therefore potential overall cumulative organic deposition and chemical persistence might occur. Sampling in areas between the BMAs could provide some information on presence of organic deposits, although the water depths may be a limiting factor.

The lack of physical environmental knowledge (ocean currents and water salinity in particular) represents a very significant data gap that should be acknowledged and addressed.

Section 6.0 - Effects of the Environment on the Project

Page 351. Superchill. "*Temperature profiles during winter months in Placentia Bay are negatively correlated with water depth (see LGL 2018b in Volume 3).*" The correlation could not be found in the document cited. Note that superchill events resulting in fish mortalities have previously occurred on the south coast of Newfoundland.

As noted in the EIS, superchill events have already occurred on the south coast of Newfoundland in 2014. These events happen when there is an intrusion of lethal water temperatures. In view of continued climate variability and change, and the occurrence of more extreme events, the likelihood exists for other superchill events to occur again in Newfoundland. Superchill events also occurred in the Maritimes in 2013 and 2015.

Page 352. Currents. "*Ocean currents within Placentia Bay are described in Section 3.1 of Appendix V, with BMA-specific summaries provided in Section 4.2.2.2. The proposed sea cage locations were selected in part due to the presence of adequate current to assist in the removal of organic deposits associated with sea cage operations, thereby minimizing depositional build-up or nutrification.*" The time-series presented and used for this Project are much too short to confidently support this statement. Also, the statement is not quantitative; the term "adequate" should be defined in this context.

Page 352. Algal Blooms. This section of the document cites DFO 2010c several times, but is not included in the references. Additionally, the DFO 2010 reference for Figure 6.1 is not known, so this information cannot be fully assessed.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Section 7.0 - Effects of the Project on the Environment

General Comment: In Section 7.1 - Fish and Fish Habitat VEC, the report does not integrate supporting documents with knowledge of existing conditions in Placentia Bay to justify the conclusions regarding the magnitude, extent, and duration of effects. Similarly, Section 7.6 - Cumulative Effects, lists the potential activities that may have an effect but lacks the integration of expected influences or consideration of the existing conditions within the bay to justify the conclusions.

Section 7.1 - Fish and Fish Habitat VEC

Page 354. Fish and Fish Habitat VEC. There is no mention of potential escapes of farmed fish as an effect of the Project on the environment, specifically fish and fish habitat. This should be discussed under operations and maintenance.

Page 359. Table 7.3 (and page 377, Table 7.6). The tables report that the potential for negative environmental effects is not significant, but the Proponent has assigned a medium level of confidence throughout these tables. A medium level of confidence would indicate that the risk of each outcome cannot be in fact "not significant."

Page 360. Feeding of Farmed Salmon. There is no evidence provided to support the predictions made about magnitude and duration of effects.

Page 362. Although it states that the presence of farmed salmon in sea cages could result in increased predators around the cages, there is no discussion of how this could subsequently increase mortality on migrating wild Atlantic Salmon smolts and adults.

Indirect genetic effects and ecological interactions are not adequately described nor are the potential effects of escapees on wild Atlantic Salmon populations.

Page 363. Deposition from the Sea Cages. Due to the limitations of the ocean current time-series (i.e. much too short) the estimated benthic loading of carbon provided in this section is not representative of what will eventually occur (see additional comments re: Appendix A: Fish and Fish Habitat Component Study).

Page 363. *"It is important to consider all of these visual indicators when assessing for impacts of aquaculture since Beggiatoa mats and opportunistic polychaete complexes (OPC) may be absent from sites due to water depth or seasonal hypoxic conditions (Hamoutene et al. 2014, 2016)." They are likely not Beggiatoa mats as reported in Verhoeven et al. 2016.*

Page 364. *"Salvo et al. (2017) found that after sites had been fallow for 15 months, the benthic communities at these sites had not returned to a state resembling that of control sites, suggesting slow recovery of benthic communities after production cycles." As stated above, recovery might not happen within timelines selected for fallowing by the Proponent. However, at this stage only regulatory requirements through DFO Aquaculture Activities Regulations (AAR) will determine compliance.*

Page 369. Monitoring of the seabed using ROV, drop camera, and surficial sediment sampling is listed as a mitigation measure that will minimize the effect of further accumulation of organic material on the seabed. Unless there is some action that will be taken based on the results of the monitoring (i.e., a threshold of 'acceptable' organic deposition after which no further net cleaning will occur), then monitoring alone will not reduce the effect of further accumulation of organic material on the seabed. The same comment applies for use of monitoring under Presence of Sea Cages (p.370).

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Newfoundland and Labrador Region

Page 371. Production of Waste Materials. There is no evidence provided to support predicted magnitude of influence over a spatial area. There is no integration of existing information about the local environment, or other aquaculture sites.

Section 7.2 - Wild salmon VEC

Page 372. There is no mention of potential escapes of farmed fish as an effect of the Project on wild salmon. This should be discussed under operations and maintenance in the context of both direct and indirect genetic effects as well as ecological effects.

Page 377. Previous comments regarding migration corridors and proximity of sea cages to salmon rivers apply here as well.

Section 7.7 - Accidents and Malfunctions

Page 434. The document states: *"Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit."* It would be useful for the reader if these other attributes were described. It also states that *"since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon."* There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability, as well as the potential impacts they may have on wild Atlantic Salmon.

Page 435. *"Some studies suggest that the use of sterile triploid salmon in aquaculture will help to prevent genetic and ecological interactions between wild and farmed salmon."* This is an overstatement as it will not prevent the occurrence of indirect genetic interactions such as competition, habitat disruption, parasite/pathogen introduction, etc. (Glover et al. 2016, Madhun et al. 2017). The EIS document references an investigation into the frequency of diploid and triploid farmed salmon escapes in rivers and concludes that there were significantly fewer triploid escapes found in rivers. Nonetheless, indirect genetic and ecological impacts can occur regardless of whether or not triploids escape and regardless of whether they enter rivers.

Page 435. In the statement *"it has been documented that farmed Atlantic Salmon escapes, in this case diploids, sometimes enter rivers that have natural spawning grounds for wild salmon stocks, and mate with wild salmon"* the word 'sometimes' should be deleted (Glover et al. 2016).

Page 435. Keyser et al. (2018) was conducted in Atlantic Canada, not in Norway, as stated.

Page 435. The reference provided states that *"even with the implementation of the best available containment measures to prevent farmed salmon from escaping from sea cages, it is considered a frequent and inevitable occurrence"*, nonetheless escapes are only discussed in the context of an accidental event. It is well known that damage to sea cages can occur during severe weather events and predator strikes, which are likely to occur despite implementation of the proposed mitigation measures. It is acknowledged that although these mitigation measures will tend to reduce this from happening, it is not 100% escape-proof.

Page 436. There is a reference to Verspoor et al. (2015), which states that *"smaller depressed stocks (i.e., lower abundances) will be more vulnerable to impacts of genetic contribution (i.e., genetic drift) than larger healthier stocks."* It is important to point out that many of the salmon rivers on the south coast of Newfoundland are small and have low salmon abundances.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 436. The EIS document seems to mix-up juvenile and adult surveys. Also, the statement "older individuals" is not correct as these were later stage hybrids and all individuals were young of the year. It should be clarified that there were no escapes captured in Fortune Bay or Bay d'Espoir in the fall 2017 surveys. DFO continues to encounter farmed escapes at its monitoring facility in Garnish, even though the nearest aquaculture site is 40-50 km away.

Page 439. The statement: "...triploid all female farmed salmon are not expected to interact either genetically or ecologically with wild salmon" is not substantiated. Although triploidy will greatly reduce genetic interactions, insufficient information exists in the literature regarding ecological interactions as this is largely unknown.

Page 440. The document states that a fish escape resulting from a complete cage breach (i.e., 160,000 farmed salmon and 16,000 Lumpfish cleaner fish) would not have a significant impact on wild salmon. On the contrary, an escape of 160,000 farmed salmon would likely have a significant effect on the wild salmon population (approximately 20,000 fish). Such a statement should have a higher level of confidence than that indicated in the EIS document (medium).

Section 7.8 – Follow-up Monitoring

Page 475. Please clarify why the Environmental Effects Monitoring and Follow-up Program (EEMP) is limited to verifying effects predictions for an accidental escape of farmed salmon on the wild salmon VEC. The EEMP should also monitor effects due to disease and pathogens, sea lice, and ecological interactions.

Page 476. Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Section 7.9 – Assessment Summary and Conclusions

7.9.1.2 - Wild salmon VEC

Page 478. The document states that: "Overall, planned Project activities on the wild salmon VEC were predicted to be not significant". The Proponent outlined in detail the various mitigation measures that will be implemented, many of which are to be commended. Although numerous mitigation measures have been built into the proposed Project, based on experience where farmed Atlantic Salmon and wild populations of Atlantic Salmon co-occur, there is a strong likelihood that wild salmon populations will be negatively impacted.

There is no mention of the potential effects of farmed escapes on wild salmon. Although there are statements that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be discussed.

7.9.2 Accidents and Malfunctions

Page 480. It is unlikely that the residual effects would not be significant. Even in the absence of direct genetic interactions, indirect and ecological interactions (disease, competition, predation, etc.) could be significant and therefore a high level of uncertainty remains. The level of confidence cannot be medium, at best it would be low.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Section 8.1 - Summary of Mitigation Measures

Table 8.1. Under the potential effect '*alter genetic integrity....*' it states that only sea cages in Rushoon BMA are <20 km from scheduled salmon rivers, whereas elsewhere in the document it states that sea cages are >50 km away from scheduled salmon rivers. Please revisit and correct the inconsistencies throughout the document.

Component Study: Wild Atlantic Salmon

Page 1, Para. 2. The potential impacts of disease/pathogens and parasites such as sea lice should also be discussed here.

Page 4, Para. 2. Please correct the statement that "*after hatching, Atlantic Salmon spend several months to several years in their natal freshwater habitat...*" as Atlantic Salmon never spend as little as several months in freshwater in Newfoundland before migrating to sea as smolt. Also, since it reports salmon that spend one winter at sea as grilse, it should then also report that salmon that spend more than one year at sea are MSW.

Page 5. It states that "*Recently, there has been interest in using European-origin farmed salmon because of their higher growth rates and other attributes that result in more economic benefit.*" It would be useful if these other attributes were described. It also states that "*since European-origin salmon have never been utilized in Newfoundland, there is no available information concerning the genetic interactions between farmed European salmon and wild Newfoundland salmon.*" There are a number of other uncertainties with respect to the use of European-origin salmon in Newfoundland waters that should be also be listed here including their performance, resistance to disease and pathogens, etc. which may affect their survivability as well as the potential impacts they may have on wild Atlantic Salmon. As they have never been used in NL, the level of confidence in many of the predicted effects should be more uncertain.

Page 10, Para. 1. DFO Science has information regarding farmed salmon captured at one of the Department's counting facilities on the south coast, Garnish River. These salmon originated from escape incidents and this information should be reported and discussed in the EIS (DFO 2018b).

Page 15, Para. 2. It is important to point out that the reduction in harvest limits being implemented this year in the Atlantic Salmon recreational fishery are for conservation purposes in response to dramatic declines in Atlantic Salmon returns to many DFO monitored rivers throughout NL over the past two consecutive years, which has not been seen since the commercial moratorium in 1992.

Page 17. Please describe the methodology used for calculating distances between sea cage sites and mouths of scheduled and non-scheduled salmon rivers.

Page 36. It states that "*the deposition of uneaten fish feed can serve to attract wild fish, including wild salmon to sea cages*" and that this could affect migration patterns if wild salmon "*choose to travel between fish farms to eat uneaten fish feed instead of actively seeking natural prey.*" This was not mentioned and discussed in the main EIS document.

Page 43. Maintaining Genetic Integrity and Biological Fitness of Wild Salmon. The report states that only the sea cages in the Rushoon BMA are located <20 km from a scheduled salmon river. However, it is also important to note that on p.16 it indicates that sea cage sites in two locations in the Long Harbour BMA are within 20 km of a non-scheduled salmon river and another river where Arctic Charr and Rainbow Trout are known to occur, and sea cage sites at two locations in the Merasheen BMA are within 20 km of another non-scheduled salmon river.

Newfoundland and Labrador Region

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Page 55. Follow-up Monitoring, Planned Project Activities. There should be some discussion about validating predictions made regarding fish health, sea lice, ecological interactions, etc.

Page 56. Follow-up Monitoring, Accidental Events. Collecting blood samples from salmon within scheduled salmon rivers following an escape event might not be the best approach for determining whether farmed salmon have entered fresh water. Follow-up monitoring should be determined in consultation with DFO.

Appendix I – Wild Atlantic Salmon Component Study: Stofnfiskur Certification and Verification (All-Female Triploid)

The document cites improved triploidy induction method but data are not provided nor does it appear to be published. It is difficult to evaluate the accuracy of these claims in its absence. Also sample sizes of 10 eggs per batch make the assumption that failures in induction are not normally distributed (i.e., 100% or high rates of failure). Again, data are not provided.

Appendix T – Wild Atlantic Salmon Component Study: Grieg NL Emergency Response Plan

Page 31. It states that *“if necessary, Grieg NL will collaborate, by sharing recapture gear, or enter into an arrangement with local fisherman to ensure that adequate recapture efforts are implemented.”* This should be mandatory and a commitment made by the Proponent to have this in place in the event DFO recommends that recapture efforts be undertaken. Recent evidence has shown that recapture efforts are most successful when implemented within 24-48 hours after an escape event because after this time escapes begin to disperse making it extremely difficult to recapture individuals. To date, past recapture efforts in the NL Region have been largely unsuccessful due to operational and environmental issues which resulted in delays in initiating recapture efforts.

Page 32, Para. 1. The document states that recapture efforts will commence as soon as possible after an escape event. This should be tightened to state: provided environmental conditions (sea state/weather conditions) are safe to do so, recapture efforts should commence within 24 hours following an escape event.

Page 32, Para. 2. It is recommended that an emergency licence should already be in place in the event an escape incident arises, so that there are no delays in initiating recapture efforts. Standard conditions could be specified ahead of time in the licence with input from DFO Science to ensure any adverse effects on wild salmon are minimized.

Page 32, Para. 3. The text should specify where (i.e., immediately adjacent to cage site) and how deep nets will be set.

Page 32, Para. 5. The document states that site staff will immediately assess the sea cage to find the suspected source of the escape and attempt to repair it. Since this is often the first course of action for site staff, there should be separate dedicated staff or an arrangement made with local fishermen who can focus their efforts on recapturing the escapes.

Page 32, Para. 6. Once again there is reference to seeking the assistance of ‘third-party providers such as local fishermen’ and engaging in recapture efforts ‘as quickly as possible.’ Again, these arrangements should be in place prior to an escape event such that recapture efforts can commence within 24 hours of an escape provided it is safe to do so. It also states that ‘recapture nets will be checked four times daily while deployed.’ Depending on time of year when recapture efforts occur, and if it's deemed appropriate to do so by DFO, nets may need to

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

be constantly tended (i.e., during peak salmon migration period in June/July when there is a higher risk of intercepting wild salmon).

Page 33. Appendix 8 appears to be missing.

Component Study: Fish and Fish Habitat

Page 14. The first paragraph has mis-referenced DFO (2017a) as the source for the preceding statements in this paragraph. However, the referenced document has no text in it that provides such information.

Page 49. *“Relative to effects on fish and fish habitat, proposed sea cage sites were selected based on sufficient currents and direction necessary to minimize depositional build-up, adequate water depth for sea cages, and suitable bottom type (i.e., >50% hard bottom).”* However, only measurements at one point for each site are reported, making the above an overstatement as far as selection of location based on currents and direction.

Additionally, the timeline of the current data used is much too short to determine dominant forcing (e.g. tide vs. wind) and variability. A minimum of one month (30 days) is necessary for the tides to be determined with reasonable accuracy, and on the order of one year to get the variability induced by atmospheric forcing (i.e. seasonality). Thus, the statement: *“siting of sea cages at locations with suitable currents and depth to distribute organic waste,”* which is repeated throughout the document and used to support the claim that most of the VEC potential effects are “not significant” is not sufficiently demonstrated in this document.

Appendix A - Fish and Fish Habitat Component Study: Grieg NL Benthic Depositional Modelling Report

The ocean current time-series used for this study are too short to give statistically robust estimates of dispersion. Looping 20 hours to a few days long time-series on itself to make it one month long does not reproduce the spring-neap tidal cycle and, even if it did, would not represent other variability that may take place on longer timescales (e.g., days to seasons). The ocean currents description provided in Appendix D of the Fish and Fish Habitat Component Study states that tide is a minor component of the total variability (~15%) thereby indicating that other processes dominate. Previous studies carried out in the area found large, and broad, peaks at low frequency on the observed currents' power spectrum (<0.5 cycles per day or less) indicating the importance low frequency variability (most likely due to storms or fairly regular strong wind events). These past observations should be stated in order to put modeling results and limitations in perspective. Longer time-series should be used to represent this large variability. One possible option would be to use the current fields published by Ma et al. (2012). While their time-series does not cover a full year (April-November) and their resolution (bathymetry and coastline) is not ideal, it is the best available dataset in absence of long observations and should provide a better order of magnitude. Modeling scenarios should also try to encompass worst cases: high feed, low currents resulting in high concentration; high feed, high currents resulting in lower concentration but larger footprint.

Appendix D - Fish and Fish Habitat Component Study: Metocean Conditions for the Placentia Bay Aquaculture Sites

General Comment. All stated names should be illustrated on a map. There are numerous instances where they are not (e.g. Brine Islands, Red Island, Ship Island, etc.). The quality of the maps is also poor and blurred, and would benefit from a higher resolution. Also, the list of references is quite short and somewhat outdated (the most recent reference is from 2008).

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

Page 5. Wind Speed. This section does not clearly describe the wind forcing seasonality (i.e. prevailing directions potentially changing seasonally). Monthly wind roses should be provided to illustrate it.

Page 28. *"The positive phase of the North Atlantic Oscillation (NAO) index results in more and stronger winter storms crossing the North Atlantic on a more northerly track, and cold dry winters in Northern Canada and Greenland, while the negative phase results in fewer and weaker storms crossing on a more west-east track."* The report should describe the resulting effect on the ocean/water column, for example, as described in Colbourne et al. (2017).

Page 36. *"In general, the near-surface currents in Placentia Bay have been observed to flow counter clockwise around the Bay."* A reference should be provided here, and also where other such statements are made. For example, the statement that follows: *"Since the variability due to tides account for approximately only 15% of the total variability, other factors are more important."* Information on the tidal analysis results is required.

Page 36. *"Winds in the area are predominately from the southwest during all seasons and this would contribute to a counter clockwise pattern in the near surface waters."* This statement is overgeneralized and misleading. This pattern is only true in steady state (geostrophic balance). While wind might be predominantly from the southwest statistically, that does not mean that it always blows from this direction and that it blows sufficiently long to induce a steady state. In fact, an example of wind forcing from the southwest shows a much different pattern (see Fig. 9 in Ma et al. 2012). Wind relaxation and/or change in direction, which occurs all the time, would also induce much different dynamics. The report provides an annual wind rose (Fig. 2.2) but this does not justify that wind is "predominately from the southwest during all seasons." In addition, the text of Section 2.3 (p. 5) states: *"There is a strong annual cycle in the wind direction. West to northwest winds which are prevalent during the winter months begin to shift counter-clockwise during March and April, resulting in a predominant southwest wind by the summer months. As autumn approaches, the tropical-to-polar temperature gradient strengthens and the winds shift slightly, becoming predominately westerly again by late fall and into winter."*

Page 36. Please provide references for the datasets that have already been documented (e.g. Memorial University data reports: Hart et al. 1999; Schillinger et al. 2000).

Page 36. It is understood that Smart Bay Buoys actually feature a current profiler, instead of a single point. This should be confirmed and the text modified if this is indeed the case.

Page 38. *"At the head of Placentia Bay on the eastern side, the Memorial data showed that the current is consistently flowing into the bay with mean speeds between 11 cm/s and 18 cm/s at a depth of 20 m."* It is unlikely that currents would flow consistently in the same direction anywhere in the bay, although its long-term mean (vector-averaged) might be. The source of this information is unclear (e.g., reference, mooring name). Please revisit and adjust the text accordingly.

Page 45. As stated previously, the MSC50 dataset is unlikely to be realistic for most of the sites of interest. Which dataset was used, MSC06Min? If not, the results presented are even less reliable. The dataset which was used should be clearly stated and described (resolution and limitations).

Page 63. A more recent paper by Ma et al. (2017) on surge in the Study Area would be beneficial and should be referenced and discussed.

Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Conclusions

Overall, the EIS documents are extensive and the topics considered within the relevant sections are generally appropriate. However, the level of certainty in the conclusions on risk characterization is insufficient and requires additional information and/or sampling.

The objective of this review was to evaluate:

The sufficiency of baseline data and appropriateness of methodologies to predict effects;

- The document cites improved triploidy induction method but data are not provided and thus the accuracy of these claims cannot be thoroughly evaluated. Also, there is insufficient data to validate that a sample size of 10 eggs is all that is required to detect failures.
- Additional physical environmental data should be collected at each site. A longer time-series of ocean currents, in particular, should be collected as well as profiles of water salinity; the former due to its importance for dispersion modeling and monitoring, and the latter due to its importance on sea-lice life cycle.
- A lot of outdated material is cited where more recent material exists. Also, some inaccurate statements are found in the reports.

The mitigation measures proposed by the Proponent;

- The list of mitigation measures proposed are fairly inclusive but do not offer solutions for larger scale effects.
- Crew change sites and resupply sites have been proposed to avoid cross-contamination. However, the proposed routes cross the BMAs which could negate this mitigation.
- There are inconsistencies in siting distances from scheduled and known (non-scheduled) salmon rivers thereby making the evaluation of this mitigation measure unviable.
- There are several sections in which there is a lack of detail to thoroughly evaluate the mitigation measures.

The level of certainty in the conclusions reached by the Proponent on the effects;

- Assessment of the risks associated with the proposed Project identified a long list of significant uncertainties associated with the proposed activities. Despite significant and numerous knowledge gaps, the report consistently concludes that there is medium to high certainty of non-significant impacts. The data do not support this conclusion.

The manner in which significance of the environmental effects, as they pertain to DFO's mandate, have been determined (i.e. the scientific merit of the information presented and the validity of the Proponent's methodologies and conclusions);

- The potential effects of farmed escapes on wild salmon have not been adequately assessed. Although there are claims that the cages are escape-proof and that the all-female triploid salmon will be 100% sterile, this has not been demonstrated in Newfoundland waters and therefore potential direct and indirect genetic effects and ecological effects should be investigated further before conclusions are made.
- The cage siting locations and conclusions regarding dispersion were based on a time-series too short to provide statistically robust estimates to inform conclusions. Related to this, limited sampling (measurements at only one point for each site) was used to make conclusions regarding suitable siting locations.

Science Response: Placentia Bay Atlantic Salmon Aquaculture Project.

Newfoundland and Labrador Region

The follow-up program proposed by the Proponent;

- As the EEMP has not yet been completed, it should consider the comments provided in this review including: verifying effects due to disease/pathogens, sea lice, ecological interactions, etc; additional sampling at each site and in areas between the BMAs to provide information on presence of and potential for organic deposits and chemical persistence; recommendations to improve the Grieg NL Emergency Response Plan.

Whether additional information is required from the Proponent to complete the technical review.

- Please see the many comments provided throughout the review.

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Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

Approved by

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June 29, 2018

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Newfoundland and Labrador Region

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Newfoundland and Labrador Region

**Science Response: Placentia Bay Atlantic
Salmon Aquaculture Project.**

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couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Rép. des Sci.
2018/nnn.

Decker, Shelley

From: Decker, Shelley
Sent: Monday, August 13, 2018 4:09 PM
To: Johnson, Roger
Subject: RE: MP form Grieg

Ok

Shelley

From: Johnson, Roger
Sent: Monday, August 13, 2018 4:07 PM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: Re: MP form Grieg

Tilman will do that

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Decker, Shelley
Sent: Monday, August 13, 2018 4:06 PM
To: Johnson, Roger
Subject: RE: MP form Grieg

Just noticed that it states "Potential Response". I'm assuming "Potential" should be removed?

Shelley

From: Johnson, Roger
Sent: Monday, August 13, 2018 3:32 PM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>; Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>;
Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: MP form Grieg

Please see attached.

You may recognize some of the wording.

Wanted to keep it simple, especially considering Jackie has extensive background info from the last 4-5 weeks

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

Bieger, Tilman

From: Bieger, Tilman
Sent: August-13-18 4:30 PM
To: Pike, Kelly J
Subject: Grieg edited
Attachments: Grieg-MP-inquiryform-August 13, 2018 complete.docx

Pls process

Sent from my BlackBerry 10 smartphone on the Bell network.

No information has been removed or severed from this page



Directives Concerning Political Representatives' Requests for Information

1. Definitions:

Employee: Any of the Department's employees.

Factual information: Information accessible to the public (examples: available on a website, part of an issued press release, divulged by a departmental representative during a meeting with the industry or partners, providing this group is not told that the information is sensitive or confidential) and not constituting opinions or political orientations.

"Other" information: Any information that the public cannot access, that is sensitive, confidential, complex or for which a political or departmental decision must be made.

Department's authorized representative: An employee such as a program specialist who is authorized to speak on behalf of the Department or who holds the position of Director.

Representative of senior management: Regional Directors General and Assistant Commissioners or at a higher level.

Political representative: A member of Parliament, a senator, a member of a province's or territory's legislative assembly, a municipality's elected official, or their designated representative(s).

2. Processing of political representatives' requests:

2.1 Summary:

The Department is committed to respond to political representatives' requests in a timely manner. Political representatives' questions are answered by the *Department's authorized representatives* or by a *representative of senior management*. Upon receiving a question from a political representative, an employee who is not an authorized representative of the Department must quickly transmit the question to an authorized representative of the Department. Any exchange of information with a political representative must be communicated to the senior management's office (Assistant Commissioner, Regional Director General or higher) the Deputy's Office and to the Minister's Office.

When a political representative's request is of interest to other sectors or regions, these sectors or regions should be consulted. In addition, the Member of Parliament Inquiry Form must be forwarded to these sectors or regions for information purposes.

Attention should be given to providing personal information to an MP, consistent with the Privacy Act, which allows for the disclosure of personal information to an MP for the purpose of assisting the individual to whom the information relates in resolving a problem.



2.2 Obligation of the employee who receives a request for factual or political information or a request for a meeting:

When a political representative contacts an employee, the employee must:

2.2.1 If the request is made by telephone:

The employee must immediately make note of the request. The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

The employee should call the political representative back within 1 working day to communicate the name of the Department's authorized representative, or of senior management's representative if necessary, who will be responsible for responding to the request, if a response could not be given during the call.

2.2.2 If the request is sent via email:

The employee must acknowledge within 1 working day that the request has been received.

If it is possible and does not delay the sending of an acknowledgement message, the acknowledgement message should include the name of the Department's authorized representative, or of the representative of senior management if necessary, and the latter should receive a copy of an acknowledgement message via email.

The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

2.3 Processing requests for factual information:

Summary: Requests for factual information will receive a response within 2 working days from program directors or specialists, meaning the Department's authorized representatives.

Requests for factual information transmitted by an employee or received directly by the authorized representative of the Department must receive a response no more than 2 working days after the Department has received the request.

When the political representative's request requires the provision of factual or "other" information, the authorized representative of the Department can immediately provide the factual information and indicate that the "other" questions (of a sensitive, confidential or political nature) will be answered once the appropriate stakeholders have been consulted.

The authorized representative of the Department must complete the Member of Parliament Inquiry Form and forward it to the office of the appropriate senior management representative (RDG, AC or ADM), sending a copy to the executive assistant, no more than 1 working day after the factual information has been shared with the political representative.

The office of senior management's representative will then forward the form to the Ministerial Liaison Office and to the Deputy Minister's office no more than four (4) hours after it was



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received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office.

2.4 Processing requests for "other" information:

Summary: Requests for "other" information (sensitive, complex, requiring the taking of a political position, confidential) will receive a response within 96 hours (four working days) from senior management's representatives (regional directors general and assistant commissioners or at a higher level). Within 2 working days of receiving a request, the Minister's Office will receive, for approval, the questions asked and suggested responses. After receiving approval for suggested responses, the member of senior management will contact the political representative.

Supported by recommendations from program directors and specialists, senior management's representative will submit, within 2 working days, the questions asked by the political representative and proposed response using the MP Inquiry Form to the Deputy Minister's office and the Ministerial Liaison Office. The Ministerial Liaison Office is responsible for forwarding the questions and the response guidelines to the Minister's Office.

The Minister's Office, through the Ministerial Liaison Office or directly, must authorize senior management's representative to transmit responses to the political representative.

Once the Minister's Office has authorized the transmission of responses, senior management's representative must give the information to the political representative within 2 working days.

In general, the political representative's responses can be provided within 96 hours (four working days) of receiving the request.

Within 1 working day, senior management's representative (or their office) will confirm with the Deputy's Office and the Ministerial Liaison Office that the information has been shared with the political representative.



2.5 Request for meetings from political representatives:

Summary: Requests for meetings with political representatives (federal, provincial, municipal) will be accepted (or declined) within 2 working days of the request. Within 1 working day, the Minister's Office will be informed of the request, for comment. Following the meeting, a summary, noting any action items, will be provided to the Minister's Office (via the Ministerial Liaison Office).

When receiving requests for meetings with political representatives, clarify, to the extent possible, details of the meeting (e.g. items to be discussed, timing considerations and participants [e.g. for an event, other participants?]).

Within four hours, notify the RDG, AC or ADM, copying the executive assistant, that a meeting has been requested by a political representative via the Member of Parliament Inquiry Form. Include relevant information (e.g. subject, timing, etc.) and recommendation to meet.

The office of the RDG, AC or ADM will endorse the recommendation (accept or decline) and forward it to the Ministerial Liaison Office, which is responsible for sending it to the Minister's Office, and to the Deputy Minister's Office. If, in the opinion of the Deputy's Office or the Minister's Office, there is an issue, the office of the RDG, AC or ADM will be advised of concerns (typically within one working day).

Within 2 working days of receiving the initial request, the authorized representative will accept or decline the Department's participation. The RDG, AC or ADM will authorize the name of the employee(s) who will participate in the meeting.

Within 1 working day of the meeting, the Department representative who met the political representative will provide a summary of the meeting, including any action items or follow up, to the RDG/AC/ADM office, with a copy to the executive assistant. The office of the RDG/AC/ADM will send the form to the Ministerial Liaison Office and to the Deputy Minister's Office no more than four hours after the form has been received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office (if relevant).

This approach applies for requests from federal, provincial, territorial and municipal elected officials, and their staff, and for senators. Meeting requests from foreign dignitaries are handled by Global Affairs Canada and this directive does not apply to such requests.



MEMBER OF PARLIAMENT INQUIRY FORM

DEMANDE DE RENSEIGNEMENTS D'UN MEMBRE DU PARLEMENT

Date: 13 August 2018

Member of Parliament:
Membre du parlement : Churence Rogers

Riding:
Circonscription : Bonavista-Burin-Trinity

Telephone No:
N°. de téléphone :

Subject:
Objet : Placentia Bay Atlantic Salmon Aquaculture Project

INQUIRY/ DEMANDE DE RENSEIGNEMENTS:

QUESTIONS:

Barbara Crann, Executive Assistant of Churence Rogers, MP, emailed with an inquiry to Jacqueline Perry, A/Regional Director, Fisheries Management regarding Fisheries and Ocean's perspective on the environmental impact statement review for the Placentia Bay Atlantic Salmon Aquaculture Project and its current status.

Potential Response

Over the past number of months DFO, as a member of the Provincial environmental assessment committee, has completed a thorough review of the Environmental Impact Statement (EIS) for the Grieg Aquaculture Project. The review, which included formal review of the EIS by a group of DFO scientists (which will be publicly released) identified a number of issues that should be addressed.

After much discussion with the proponent and Provincial officials, DFO last week advised the Province that the issues identified by our review can be addressed through regulatory processes that would take place should the project proceed. This is aligned with decisions the Department made when it reviewed the importation and grow-out of imported triploid salmon eggs in 2016. The Department is continuing to state that more information could be provided on the potential ecological (non-genetic) effects of an escape of a large number of farmed salmon. How that should be addressed is a Provincial decision.

Our personnel continue to work with the Province (through the EA committee and directly) to help them respond to or address comments they received on the EIS from other parties.

The Province has not announced any decision on the EIS (despite their July 30 deadline for doing so).



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Employee Name:	Roger Johnson
Nom de l'employé :	
Position:	A/Regional Manager – Aquaculture
Poste :	
Telephone No:	(709) 772-3296
Nº. de téléphone :	
Sector or Region/Secteur ou région	Ecosystem Management
Approved by/Approuvé par :	

Copy forwarded for
information to the
sector/office:
Copie acheminée pour
information au
secteur/bureau :

Bieger, Tilman

From: Bieger, Tilman
Sent: August-13-18 4:40 PM
To: Pike, Kelly J
Subject: Accepted: Grieg EIS

What prompted this invite?

Organizer: Bieger, Tilman
When: 10:00 AM - 10:30 AM August 14, 2018
Subject: Accepted: Grieg EIS
Location: Ben's office

Decker, Shelley

From: Pike, Kelly J
Sent: Monday, August 13, 2018 4:40 PM
To: Butler, Annette
Cc: Dawe, Lana; Abbass, Lily; jacqueline.perry@mobile.gc.ca; Bieger, Tilman; Johnson, Roger; Griffiths, Helen
Subject: RE: Update
Attachments: Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1).docx

Annette, please find attached proposed response for RDG approval.

Hard copy to follow.

Kelly

From: Perry, Jacqueline
Sent: Monday, August 13, 2018 10:20 AM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>; Abbass, Lily <Lily.Abbass@dfo-mpo.gc.ca>; jacqueline.perry@mobile.gc.ca
Subject: FW: Update

Good morning Tilman,

Can you please prepare a MP Inquiry Form with a proposed response to MP Rogers office. I will forward them on to DMO/MINO for approval before we respond to Ms. Crann.

Let me know if you have any concerns.

Thank you,

Annette

From: Rogers, Churence - Assistant 1 [<mailto:Churence.Rogers.A1@parl.gc.ca>]
Sent: 2018-August-13 10:05 AM
To: Perry, Jacqueline
Subject: Update

s.19(1)

Hello Jackie,

The MP and I are heading into a meeting with the MIN tomorrow and Churence wanted me to reach out to get your perspective on things with Grieg and where things stand with the project now? After your meeting with the proponent, what's the next steps?

If an email is too much, I'd appreciate a quick chat if you have a moment??

Many thanks,
Barb

Barbara Crann
Executive Assistant~
MP Churence Rogers
Bonavista-Burin-Trinity

No information has been removed or severed from this page



**MEMBER OF PARLIAMENT
INQUIRY FORM**

**DEMANDE DE
RENSEIGNEMENTS D'UN
MEMBRE DU PARLEMENT**

Date: 13 August 2018

Member of Parliament:
Membre du parlement : Churence Rogers

Riding:
Circonscription : Bonavista-Burin-Trinity

Telephone No:
N°. de téléphone :

Subject:
Objet : Placentia Bay Atlantic Salmon Aquaculture Project

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Employee Name:
Nom de l'employé :

Roger Johnson

Position:

Poste :

A/Regional Manager – Aquaculture

Telephone No:

Nº. de téléphone :

(709) 772-3296

Sector or Region/Secteur
ou région

Ecosystems Management

Approved by/Approuvé
par :

Copy forwarded for
information to the
sector/office:
Copie acheminée pour
information au
secteur/bureau :



Directives Concerning Political Representatives' Requests for Information

1. Definitions:

Employee: Any of the Department's employees.

Factual information: Information accessible to the public (examples: available on a website, part of an issued press release, divulged by a departmental representative during a meeting with the industry or partners, providing this group is not told that the information is sensitive or confidential) and not constituting opinions or political orientations.

"Other" information: Any information that the public cannot access, that is sensitive, confidential, complex or for which a political or departmental decision must be made.

Department's authorized representative: An employee such as a program specialist who is authorized to speak on behalf of the Department or who holds the position of Director.

Representative of senior management: Regional Directors General and Assistant Commissioners or at a higher level.

Political representative: A member of Parliament, a senator, a member of a province's or territory's legislative assembly, a municipality's elected official, or their designated representative(s).

2. Processing of political representatives' requests:

2.1 Summary:

The Department is committed to respond to political representatives' requests in a timely manner. Political representatives' questions are answered by the *Department's authorized representatives* or by a *representative of senior management*. Upon receiving a question from a political representative, an employee who is not an authorized representative of the Department must quickly transmit the question to an authorized representative of the Department. Any exchange of information with a political representative must be communicated to the senior management's office (Assistant Commissioner, Regional Director General or higher) the Deputy's Office and to the Minister's Office.

When a political representative's request is of interest to other sectors or regions, these sectors or regions should be consulted. In addition, the Member of Parliament Inquiry Form must be forwarded to these sectors or regions for information purposes.

Attention should be given to providing personal information to an MP, consistent with the Privacy Act, which allows for the disclosure of personal information to an MP for the purpose of assisting the individual to whom the information relates in resolving a problem.



2.2 Obligation of the employee who receives a request for factual or political information or a request for a meeting:

When a political representative contacts an employee, the employee must:

2.2.1 If the request is made by telephone:

The employee must immediately make note of the request. The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

The employee should call the political representative back within 1 working day to communicate the name of the Department's authorized representative, or of senior management's representative if necessary, who will be responsible for responding to the request, if a response could not be given during the call.

2.2.2 If the request is sent via email:

The employee must acknowledge within 1 working day that the request has been received.

If it is possible and does not delay the sending of an acknowledgement message, the acknowledgement message should include the name of the Department's authorized representative, or of the representative of senior management if necessary, and the latter should receive a copy of an acknowledgement message via email.

The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

2.3 Processing requests for factual information:

Summary: Requests for factual information will receive a response within 2 working days from program directors or specialists, meaning the Department's authorized representatives.

Requests for factual information transmitted by an employee or received directly by the authorized representative of the Department must receive a response no more than 2 working days after the Department has received the request.

When the political representative's request requires the provision of factual or "other" information, the authorized representative of the Department can immediately provide the factual information and indicate that the "other" questions (of a sensitive, confidential or political nature) will be answered once the appropriate stakeholders have been consulted.

The authorized representative of the Department must complete the Member of Parliament Inquiry Form and forward it to the office of the appropriate senior management representative (RDG, AC or ADM), sending a copy to the executive assistant, no more than 1 working day after the factual information has been shared with the political representative.

The office of senior management's representative will then forward the form to the Ministerial Liaison Office and to the Deputy Minister's office no more than four (4) hours after it was



received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office.

2.4 Processing requests for "other" information:

Summary: Requests for "other" information (sensitive, complex, requiring the taking of a political position, confidential) will receive a response within 96 hours (four working days) from senior management's representatives (regional directors general and assistant commissioners or at a higher level). Within 2 working days of receiving a request, the Minister's Office will receive, for approval, the questions asked and suggested responses. After receiving approval for suggested responses, the member of senior management will contact the political representative.

Supported by recommendations from program directors and specialists, senior management's representative will submit, within 2 working days, the questions asked by the political representative and proposed response using the MP Inquiry Form to the Deputy Minister's office and the Ministerial Liaison Office. The Ministerial Liaison Office is responsible for forwarding the questions and the response guidelines to the Minister's Office.

The Minister's Office, through the Ministerial Liaison Office or directly, must authorize senior management's representative to transmit responses to the political representative.

Once the Minister's Office has authorized the transmission of responses, senior management's representative must give the information to the political representative within 2 working days.

In general, the political representative's responses can be provided within 96 hours (four working days) of receiving the request.

Within 1 working day, senior management's representative (or their office) will confirm with the Deputy's Office and the Ministerial Liaison Office that the information has been shared with the political representative.



2.5 Request for meetings from political representatives:

Summary: Requests for meetings with political representatives (federal, provincial, municipal) will be accepted (or declined) within 2 working days of the request. Within 1 working day, the Minister's Office will be informed of the request, for comment. Following the meeting, a summary, noting any action items, will be provided to the Minister's Office (via the Ministerial Liaison Office).

When receiving requests for meetings with political representatives, clarify, to the extent possible, details of the meeting (e.g. items to be discussed, timing considerations and participants [e.g. for an event, other participants?]).

Within four hours, notify the RDG, AC or ADM, copying the executive assistant, that a meeting has been requested by a political representative via the Member of Parliament Inquiry Form. Include relevant information (e.g. subject, timing, etc.) and recommendation to meet.

The office of the RDG, AC or ADM will endorse the recommendation (accept or decline) and forward it to the Ministerial Liaison Office, which is responsible for sending it to the Minister's Office, and to the Deputy Minister's Office. If, in the opinion of the Deputy's Office or the Minister's Office, there is an issue, the office of the RDG, AC or ADM will be advised of concerns (typically within one working day).

Within 2 working days of receiving the initial request, the authorized representative will accept or decline the Department's participation. The RDG, AC or ADM will authorize the name of the employee(s) who will participate in the meeting.

Within 1 working day of the meeting, the Department representative who met the political representative will provide a summary of the meeting, including any action items or follow up, to the RDG/AC/ADM office, with a copy to the executive assistant. The office of the RDG/AC/ADM will send the form to the Ministerial Liaison Office and to the Deputy Minister's Office no more than four hours after the form has been received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office (if relevant).

This approach applies for requests from federal, provincial, territorial and municipal elected officials, and their staff, and for senators. Meeting requests from foreign dignitaries are handled by Global Affairs Canada and this directive does not apply to such requests.



**MEMBER OF PARLIAMENT
INQUIRY FORM**

**DEMANDE DE RENSEIGNEMENTS
D'UN MEMBRE DU PARLEMENT**

Date:

Member of Parliament:

Membre du parlement :

Riding:

Circonscription :

Telephone No:

N°. de téléphone :

Subject:

Objet :

**INQUIRY/ DEMANDE DE
RENSEIGNEMENTS:**

QUESTIONS:

Please specify the subject (for example, meeting request, a summary of transmitted information, etc.), meeting, etc. // Veuillez préciser l'objet (par exemple, une demande de rencontre, un résumé de l'information transmise), les rencontres, etc.

Employee Name:

Nom de l'employé :

Position:

Poste :

Telephone No:

N°. de téléphone :

Sector or Region/Secteur
ou région

Approved by/Approuvé
par :

Copy forwarded for
information to the
sector/office:

Copie acheminée pour
information au
secteur/bureau :



No information has been removed or severed from this page

Johnson, Roger

From: Grant, Carole
Sent: Monday, August 13, 2018 5:28 PM
To: Sweeney, Joanne
Cc: Hendry, Christopher; Johnson, Roger
Subject: RE: please review the attached and provide comments by noon on Monday, August 13, 2018
Attachments: Escaped Aquaculture Salmon Sampling Protocol_27Jul2018_IRB.docx

Hi Joanne,

As discussed, with respect to bullet 2 listed under Fisheries and Oceans for the Draft EIS Recommendation Placentia Bay Atlantic Salmon Aquaculture Project *'What are the contents of an escape response kit? (Note: the contents are listed in the EIS Appendix T on page 32 and appear to comply with the minimum gear requirements of Schedule 1 of the Code of Containment.)'*, in addition to the 3 items listed in Appendix T, it will also be important for the operators to have biological sampling equipment readily available. To this end, I've attached a sampling protocol that will be attached to any licences issued by DFO to aquaculture operators required to undertake recapture efforts.

Carole

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: August-10-18 2:39 PM
To: Hanchar, Dorothea; Ficzer, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Griffiths, Helen; Squires, Susan
Subject: please review the attached and provide comments by noon on Monday, August 13, 2018

Good Afternoon,

I've received final EIS review comments from DFO (attached) and have summarized all EAC review comments in the attached draft EIS recommendation, which includes a suggested path forward for after each comment. Please review and provide your comments to me by noon on Monday, August, 13, 2018.

Feel free to call me if you have any questions or wish to discuss.

Joanne Sweeney

Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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Escaped Aquaculture Salmon Sampling Protocol

Collection Protocol

Gillnetting

Set nets proximal to the cage where the escape event has occurred. Allow nets (probably 4 inch gill nets) to soak a maximum of 1 hour per set. Actively tend nets throughout the duration. Sampling should consist of six one-hour tended sets. If during the set it is obvious a fish has become entangled, the net is to be pulled and the fish processed as per below.

Farmed Salmon Sampling Protocol

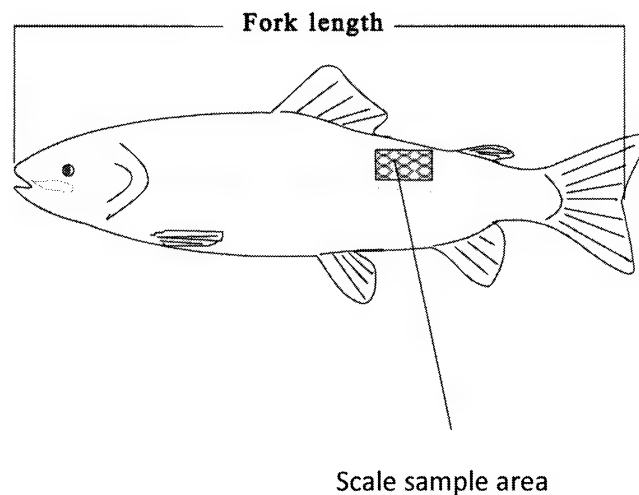
1. All putative farmed salmon caught will be sampled for biological characteristics (Whole Weight, Gutted Weight, Fork Length, Sex, and Maturity), scales (see below), and a genetic sample (fin clip – see details below).
2. All farmed fish should be photographed. Prior to taking a photo of the fish, take a photo of the sample envelope with the specimen number on it (or at a minimum a photo of something other than a fish to be able to easily separate photos later). Photos should include:
 - a. Photo of left side of whole specimen on measuring board
 - b. Close up of tail on measuring board showing fork length
 - c. Photos of fin wear
 - d. Photos of eye bulges or other abnormalities
 - e. Photo of gut still in body cavity
 - f. Photo of gonad
 - g. Photo of dissected stomach and contents
3. Record site ID and description, waypoint (coordinate information), start and end time, and environmental data (cloud cover, weather conditions, wind direction, water temperature, and air temperature).
4. All wild fish should be released as soon as possible.
5. All aquaculture fish should be lethally sampled and disposal of according to DFO regulations.
6. Any wild salmon mortalities should be properly tagged and returned to NAFC for proper disposal according to DFO regulations.

Scale Samples

Scales are collected mainly for ageing purposes, but can also be used to confirm the genetic identification of salmon which are suspected to be of farmed origin.

Place the salmon on the measuring board with its left side up. Collect scale samples from an area 3-6 scale rows above the lateral line, just back of the dorsal fin preferably on the left hand side of the fish. Using a clean knife remove the mucus from the sample area by rubbing the knife in a head-to-tail direction. Clean the mucus from the knife and remove scales from the fish by scraping the knife in a tail-to-head direction. Try to remove approximately 20-25 scales and place them on paper (cut into small

squares) before storing the sample in the envelope provided. Fold the paper so that it covers the scales on both sides, but be careful to ensure the scales are not in the fold of the paper. Ensure scale envelope is labelled with all pertinent information, including FL, WW, Sex, fin clips, date, location, how collected, name of collector, etc.). Note: It is important to clean knife thoroughly after taking scale sample, so the next sample is not mixed with scales from several fish (i.e., 'cross-contamination').



Fin Clips

Fin clips are used mainly for DNA identification and can be used to confirm the genetic identification of salmon which are suspected to be of farmed origin. Fin clips should be sampled from salmon which are either alive or as shortly after death as possible. ***Extensive time delays or freezing of samples results in DNA breakdown.***

Collect fin clips (1 cm x 1 cm) from the caudal/tail fin (Fig. 3), and quickly place in a vial containing 95% ethanol. NOTE: vials contain 95% ethanol which is flammable and poisonous, read attached MSDS sheets before proceeding (see Appendix A). Tissue in vial should not exceed 25% of volume of preservative (Fig. 4) and each vial should be labeled with an identification number (ID). Since the salmon may also be sampled for scales, use the same specimen/ID on the vial as on the scale envelope for that salmon. It is important to properly label the vial with the date, location, and ID on the log sheet provided. If samples are being stored, ethanol will generally need to be replaced after 2 weeks of storage. Vials should be stored in a cool, dark place, if possible.

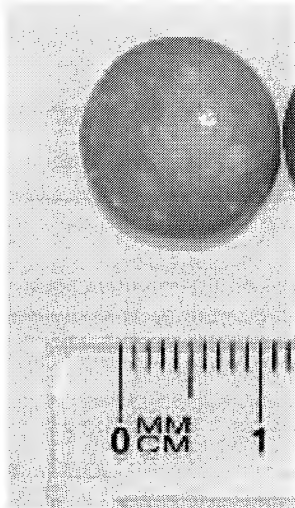
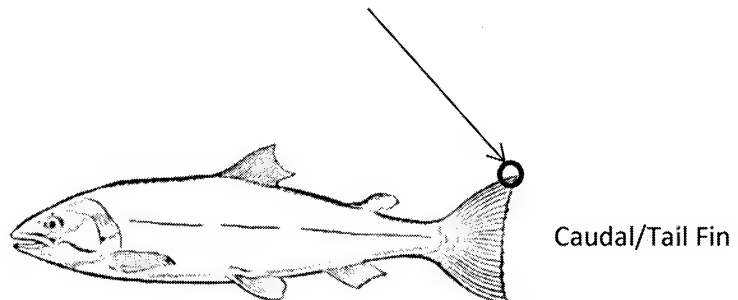
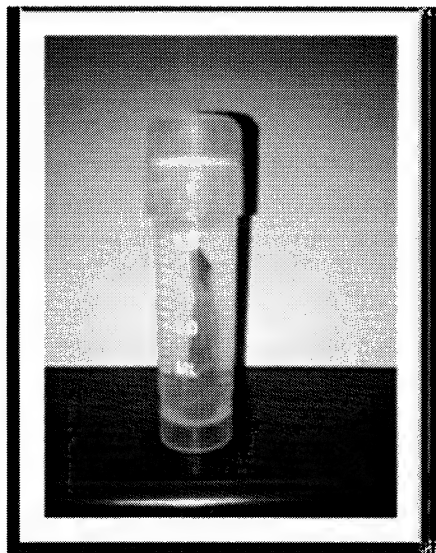


Figure: Example of tissue size requested in 2 ml vial of ethanol



Contact

For further information or questions, please contact **Ian Bradbury 709 772-3869 (office)** or [REDACTED] (cell).

s.16(2)(c)

Appendix A – Ethanol MSDS



Commercial Alcohols
A Trade Name of GreenField Specialty Alcohols Inc.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: ETHYL ALCOHOL (ANHYDROUS)

Page 1 of 6

MSDS NO: 1009

EFFECTIVE DATE: February 1, 2014

MANUFACTURED BY:

Commercial Alcohols

Bruce Energy Centre
4th Concession
Tiverton, Ontario
N0G 2T0

275 Bloomfield Road
Chatham,
Ontario
N7M 5J5

2 Chelsea Lane
Brampton, Ontario
L6T 3Y4

EMERGENCY PHONE NUMBER: CANUTEC (613) 996-6666

TRANSPORTATION

s.68(a)

**Pages 1634 to / à 1638
are withheld pursuant to section
sont retenues en vertu de l'article**

68(a)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Johnson, Roger

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Monday, August 13, 2018 5:31 PM
To: Grant, Carole
Cc: Hendry, Christopher; Johnson, Roger; Squires, Susan
Subject: RE: please review the attached and provide comments by noon on Monday, August 13, 2018

Thanks Carole. This information can be provided to the proponent at the time of the minister's decision.

Regards,

Joanne

Joanne Sweeney

Environmental Assessment Division
Department of Municipal Affairs and Environment
PO Box 8700, St. John's NL A1B 4J6
Tel. (709) 729-2822

From: Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>
Sent: Monday, August 13, 2018 5:28 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Cc: Hendry, Christopher <Christopher.Hendry@dfo-mpo.gc.ca>; Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: please review the attached and provide comments by noon on Monday, August 13, 2018

Hi Joanne,

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Carole

From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: August-10-18 2:39 PM
To: Hanchar, Dorothea; Ficzer, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Griffiths, Helen; Squires, Susan
Subject: please review the attached and provide comments by noon on Monday, August 13, 2018

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Feel free to call me if you have any questions or wish to discuss.

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: August-13-18 6:02 PM
To: Griffiths, Helen; Bieger, Tilman; Pilgrim, Bret; Decker, Shelley; Johnson, Roger; Grant, Carole
Cc: Squires, Susan
Subject: DFO direction requested
Attachments: DFO - Province Letter Aug 10-2018.pdf

Hi All,

Clarification is requested on the following comment in DFO's August 10, 2018 letter to the EA Director (attached) regarding the EIS review:

"We remain of the view that additional information should be provided about the potential ecological impacts (such as through predation or competition) that an escape of a large number of farm salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic Salmon. We defer to the EA Committee and officials of your department to decide if and how this should be achieved."

I look forward to your response.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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s.13(1)(c)

Page 1642
is a duplicate of
est un duplicata de la
page 1568

Decker, Shelley

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Monday, August 13, 2018 6:50 PM
To: Bieger, Tilman
Cc: Squires, Susan; Johnson, Roger; Grant, Carole; Decker, Shelley; Pilgrim, Bret; Griffiths, Helen
Subject: RE: DFO direction requested

Thanks Tilman. All future correspondence will be directed to Helen.

Regards,

Joanne

Joanne Sweeney

Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

From: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Sent: Monday, August 13, 2018 6:19 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Cc: Squires, Susan <SusanSquires@gov.nl.ca>; Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: Re: DFO direction requested

Hello Joanne.

Helen Griffiths, as the Manager of the Fisheries Protection Program - Regulatory Review, will follow up on this message with you tomorrow.

To avoid confusion, I encourage you to please direct all correspondence related to the EIS for the Grieg project to Helen as the single point of contact for DFO for that issue.

Thanks.

Tilman Bieger
A/Regional Director, Ecosystems Management - NL

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Sweeney, Joanne
Sent: Monday, August 13, 2018 6:01 PM
To: Griffiths, Helen; Bieger, Tilman; Pilgrim, Bret; Decker, Shelley; Johnson, Roger; Grant, Carole
Cc: Squires, Susan
Subject: DFO direction requested

Hi All,

Clarification is requested on the following comment in DFO's August 10, 2018 letter to the EA Director (attached) regarding the EIS review:

"We remain of the view that additional information should be provided about the potential ecological impacts (such as through predation or competition) that an escape of a large number of farm salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic Salmon. We defer to the EA Committee and officials of your department to decide if and how this should be achieved."

I look forward to your response.

Regards,

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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s.13(1)(c)

Bieger, Tilman

From: Bieger, Tilman
Sent: August-13-18 7:33 PM
To: Butler, Annette
Subject: Re: URGENT - Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1) (2).docx

Give me 15 min pls

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butler, Annette
Sent: Monday, August 13, 2018 7:18 PM
To: Bieger, Tilman
Cc: Abbass, Lily; Pike, Kelly J
Subject: FW: URGENT - Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1) (2).docx

Hi Tilman,

Can you please provide a response to Saba's questions?

Annette

From: Khwaja, Saba
Sent: 2018–August-13 7:11 PM
To: Butler, Annette; Butcher, Ashley; Kahn, Zoe
Cc: Jarjour, Jasmine; Grant, Carole; Gratton, Janie
Subject: RE: URGENT - Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1) (2).docx

Hi Annette,

This looks good, I had a couple of questions. The response indicates that the "formal review of the EIS by a group of DFO scientists (which will be publicly released)" – can an indication of when that would be released be indicated, or is the response intentionally silent on that point? It also states that "The Province has not announced any decision on the EIS. July 30th was the deadline for making an announcement on a decision." – can anything be said about the implications of missing that deadline.

Thanks

From: Butler, Annette
Sent: Monday, August 13, 2018 4:33 PM
To: Butcher, Ashley <Ashley.Butcher@dfo-mpo.gc.ca>; Kahn, Zoe <Zoe.Kahn@dfo-mpo.gc.ca>; Khwaja, Saba <Saba.Khwaja@dfo-mpo.gc.ca>
Cc: Jarjour, Jasmine <Jasmine.Jarjour@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Gratton, Janie <Janie.Gratton@dfo-mpo.gc.ca>
Subject: URGENT - Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1) (2).docx
Importance: High

Good afternoon Ashley/Saba,

The attached MP Inquiry is provided for your approval.

Please advise if you have any concerns. We would like to respond to Barbara this evening in advance of tomorrow's meeting if possible.

Let me know if you have any concerns.

Thank you,

Annette

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: August-13-18 7:50 PM
To: Butler, Annette
Cc: Abbass, Lily; Pike, Kelly J
Subject: Re: URGENT - Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1) (2).docx

I don't believe there is a clear date on when the CSAS report would be published/released. I believe likely in a few weeks/months. Science maybe could advise - but I suggest no need to be precise for purpose of this.

The Province has delayed the decision on the EA for the project. I don't believe that is causing problems for proponent at this time. The company has told us that a prolonged delay, such as would be caused by the Province requiring an addendum to the EA, might cause them to delay start of construction until next year. Not sure if that is accurate.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butler, Annette
Sent: Monday, August 13, 2018 7:18 PM
To: Bieger, Tilman
Cc: Abbass, Lily; Pike, Kelly J
Subject: FW: URGENT - Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1) (2).docx

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To: Butler, Annette; Butcher, Ashley; Kahn, Zoe
Cc: Jarjour, Jasmine; Grant, Carole; Gratton, Janie
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Hi Annette,

This looks good, I had a couple of questions. The response indicates that the "formal review of the EIS by a group of DFO scientists (which will be publicly released)" – can an indication of when that would be released be indicated, or is the response intentionally silent on that point? It also states that "The Province has not announced any decision on the EIS. July 30th was the deadline for making an announcement on a decision." – can anything be said about the implications of missing that deadline.

Thanks

From: Butler, Annette
Sent: Monday, August 13, 2018 4:33 PM
To: Butcher, Ashley <Ashley.Butcher@dfo-mpo.gc.ca>; Kahn, Zoe <Zoe.Kahn@dfo-mpo.gc.ca>; Khwaja, Saba

<Saba.Khwaja@dfo-mpo.gc.ca>

Cc: Jarjour, Jasmine <Jasmine.Jarjour@dfo-mpo.gc.ca>; Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Gratton, Janie <Janie.Gratton@dfo-mpo.gc.ca>

Subject: URGENT - Grieg-MP-inquiryform Churence Rogers-August 13 2018(v.1) (2).docx

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Let me know if you have any concerns.

Thank you,

Annette

**Pages 1649 to / à 1650
are duplicates of
sont des duplicatas des
pages 1616 to / à 1617**

Griffiths, Helen

From: Griffiths, Helen
Sent: August-14-18 9:19 AM
To: 'Sweeney, Joanne'
Cc: Squires, Susan; Bieger, Tilman
Subject: RE: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hi Joanne

Checked with DFO Science re: your question. Response is, "Yes escaped lumpfish that are in cages as cleaner fish could breed with wild fish – but given the cleaner fish are derived from the wild caught fish from the same area(and genetic stock) there is no reason to suspect that there would be any genetic impact".

From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: August-09-18 1:30 PM
To: Johnson, Roger; Griffiths, Helen; Bieger, Tilman
Cc: Squires, Susan
Subject: FW: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Perhaps I should have included others within DFO on this email, who have participated in recent discussions with the EAC Chair regarding the Placentia Bay Atlantic Salmon Aquaculture Project. My apologies.

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

From: Sweeney, Joanne
Sent: Thursday, August 9, 2018 1:23 PM
To: Hendry, Christopher (Christopher.Hendry@dfo-mpo.gc.ca) <Christopher.Hendry@dfo-mpo.gc.ca>
Cc: Whelan, Dr. Daryl S <DarylSWhelan@gov.nl.ca>; Squires, Susan <SusanSquires@gov.nl.ca>
Subject: FW: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hi Chris,

I'm looking for some guidance on a question in the email below, which I incorrectly posed to Daryl, and he has referred me to you. Can you/DFO advise?

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

From: Whelan, Dr. Daryl S
Sent: Thursday, August 9, 2018 1:19 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Subject: Re: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hello Joanne. I would refer you to Chris Hendry at DFO for response.

Dr. Daryl Whelan
Chief Aquaculture Veterinarian
Director - Aquatic Animal Health Division
Fisheries and Land Resources
T: 709 729-6872
E: darylswhelelan@gov.nl.ca

From: Sweeney, Joanne
Sent: Thursday, August 9, 2018 12:20 PM
To: Whelan, Dr. Daryl S
Cc: Squires, Susan
Subject: questions regarding the potential effects of Newfoundland broodstock lumpfish on wild lumpfish

Hi Daryl,

Would you provide a response to the following public concern, which refers the potential effects of escaped sea cage lumpfish on wild lumpfish:

"The result of non-significant effects is based on incorrect assumptions:
lumpfish could mature in the wild and interbreed with wild lumpfish."

Specifically, is there potential for escaped (sea cage) juvenile lumpfish to mature in the wild and interbreed with wild lumpfish?

Further to this, page 438 of the EIS (Main Text) states the following, as a mitigation measure:

"The use of Newfoundland broodstock lumpfish as cleaner fish in the sea cages avoids any genetic effect of breeding between cleaner fish and wild lumpfish"

Is this a true statement?

Your response is anticipated. Please call me at 729-2822 if you need clarification or wish to discuss.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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Decker, Shelley

From: Griffiths, Helen
Sent: Tuesday, August 14, 2018 9:28 AM
To: Decker, Shelley
Subject: FW: partial draft EIS recommendation
Attachments: 1834_draft EIS recommendation_13Aug18.doc

Can you cross reference our comments in this draft recommendation with the last set of comments we sent back, please? thanks

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: August-13-18 9:12 PM
To: Hanchar, Dorothea; Ficzer, Vicki; Angelopoulos, John; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Griffiths, Helen
Cc: Squires, Susan
Subject: partial draft EIS recommendation

Hi All,

I've attached a partial draft of the EIS recommendation to the minister. Please review the **EAC SCIENTIFIC AND TECHNICAL REVIEW COMMENTS**, which should reflect/summarize the EIS review comments you forwarded to me. Also, review my **ANALYSIS OF EAC SCIENTIFIC AND TECHNICAL REVIEW COMMENTS for accuracy**. Feel free to make revisions in track changes and call me if there's anything you'd like to discuss.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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Registration 1834

MEMO TO: Honourable Andrew Parsons, Minister
Municipal Affairs and Environment

THROUGH: Jamie Chippett, Deputy Minister
Dana Spurrell, Assistant Deputy Minister
Susan Squires, Director, EA Division

FROM: Joanne Sweeney, Environmental Scientist, EA Division

DATE: August , 2018

SUBJECT: **Recommendation concerning the acceptability of the EIS
for the Placentia Bay Atlantic Salmon Aquaculture Project**

BACKGROUND

On February 19, 2016, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. registered the Placentia Bay Atlantic Salmon Aquaculture Project (the project) for environmental assessment in accordance with the *Environmental Protection Act (the Act)*. These companies are owned by Grieg NL Salmon Ltd. (the proponent), a private company registered in Newfoundland and Labrador. Grieg is 80% owned by the Norwegian based Grieg Group and 20% owned by the Newfoundland based Ocean Choice International (OCI).

The proponent plans to construct and operate a land-based Recirculation Aquaculture System (RAS) Hatchery for Atlantic salmon in the Marystown Marine Industrial Park, and marine-based farms in Placentia Bay. The land-based hatchery will be developed on approximately 10 hectares of serviced land and will produce up to seven million European-strain Atlantic salmon smolt per production cycle, for transfer to the marine-based component. The marine-based component will involve the operation of 11 seafarms located in four proposed Bay Management Areas (BMAs) within Placentia Bay: Rushoon, Merasheen, Red Island, and Long Harbour. Each seafarm will consist of multiple cages with cage collars at the surface and nets extending down to 43 meters. The northern region of Placentia Bay, surrounding the Merasheen Islands, encompasses an area of about 245,000 hectares. The four BMAs will occupy a total of 1,958 hectares, of which a total of 24 hectares will be occupied by seafarms. At peak, the seafarms will produce approximately 33,000 metric tonnes of live weight Atlantic salmon per production cycle. The development of the project, including the construction and operation of the hatchery and seafarms, will occur

over an eight year phased approach before reaching peak production. The proposal describes construction of the hatchery in year one, the first arrival of eggs in year two, production of smolt and operation of seafarms increasing from two million fish per year in year three to seven million fish per year in year seven. The first harvest of fish at peak production at the seafarms is anticipated to occur in year eight.

The minister was due to issue a decision to the proponent regarding the acceptability of the EIS by July 31, 2018, in order to meet the timeline prescribed by the *Environmental Assessment Regulations (EA Regs.)*, which require the decision to be issued to the proponent within 70 days of submission of the EIS document(s).

CHRONOLOGY

The Province carried out an environmental assessment of the project pursuant to the *Act* and the *EA Regs.* Specific phases of the assessment included:

- February 19, 2016 - project registered
- July 22, 2016 - minister released project subject to terms and conditions
- August 31 & September 29, 2016 – appeals of minister’s release decision
- October 14 & October 19, 2016 – minister’s decisions announced to dismiss appeals
- July 20, 2017 - Supreme Court of Newfoundland and Labrador overturned minister’s release decision and ordered the completion of an EIS
- November 9, 2017 - minister advised proponent that an EIS is required.
- November 22, 2017 - minister appointed an environmental assessment committee (EAC) and the EAC drafted EIS guidelines for public review and comment
- March 8, 2018 - minister issued approved EIS guidelines to proponent within legislated timeline of 120 days after notifying the proponent of EIS requirement
- May 22, 2018 – minister acknowledged receipt of the EIS and initiated 50-day public and technical review
- July 11, 2018 – initial deadline for public EIS comments
- July 25, 2018 – extended deadline for public EIS comments
- July 31, 2018 – minister’s EIS acceptability decision was initially due
- August , 2018 – extended deadline for minister’s EIS decision

INTERGOVERNMENTAL CONSULTATION

The EIS and associated documents were circulated to the EAC for review and the provision of scientific and technical project-related advice, as well as a recommendation as to whether or not the EIS is acceptable and whether or not the project can proceed in an environmentally acceptable manner. Provincial government departments represented on the EAC are:

- Department of Municipal Affairs and Environment (MAE)
 - Environmental Assessment Division (EA Division)

- Pollution Prevention Division (PPD)
 - Water Resources Management Division (WRMD)
- Department of Fisheries and Land Resources (FLR)
 - Aquaculture Development Division (ADD)
 - Aquatic Animal Health Division (AAHD)
 - Forestry and Wildlife Branch (FWB)
- Department of Tourism, Culture, Industry, and Innovation (TCII)
 - Tourism Product Development (Tourism)

Federal government departments represented on the EAC are:

- Fisheries and Oceans Canada (DFO)
- Environment and Climate Change Canada (ECCC)
- Health Canada (HC)
- Transport Canada (TC)

The Canadian Food Inspection Agency (CFIA) informed that they are available to participate in an advisory role, if needed.



s.13(1)(c)

PUBLIC CONSULTATION

An Environmental Assessment (EA) News Bulletin was published on the Government of Newfoundland and Labrador's web site and the Department of Municipal Affairs and Environment (MAE) web site on May 22, 2018, advising the public that the EIS had been submitted and requesting that public review comments be submitted within 50 days (by July 11, 2018). The EIS document, component studies, and associated appendices describing the proposed undertaking were posted on the MAE web site. A notification was sent to subscribers of the EA News Bulletin (includes environmental groups, media, government agencies, municipal organizations and interested members of the public) advising of the EIS submission and initiation of the public review period. The following Towns/ Communities in the vicinity of the proposed project area were advised of the EIS submission and the public review period:

- Burin
- Fortune
- Grand Bank
- Marystown
- Placentia
- Rushoon
- Southern Harbour
- St. Brides
- St. Lawrence

The public was engaged in the EIS review process, as emails/letters were received from 29 individuals and 17 groups in support of the project. Emails and letters expressing concern and opposition to the project were received from 87 individuals and 12 groups. Additionally, 423 copies of a form letter expressing concern and opposition to the project, each with an individual signature, were submitted during the public consultation period.

Groups expressing support for the project include:

- Newfoundland Aquaculture Industry Association (NAIA)
- Keyin College, Burin Peninsula
- Newfoundland Styro
- Burin Peninsula Joint Council
- Edwards & Associates Ltd.
- Eimskip Canada
- Harbour Grace Ocean Enterprises
- Long Harbour Development Association
- Pennecon
- Placentia West Development Association
- Town of Burin
- Town of Marystown
- Building Trades of Newfoundland and Labrador (Trades NL)
- Burin Peninsula Chamber of Commerce
- Grand Bank Development Corporation

- Marystown Lions Club
- Town of Winterland

Groups expressing concern for and opposition to the project include:

- FFAW-Unifor
- Freshwater-Alexander Bays Ecosystem Corporation (FABEC)
- Atlantic Salmon Federation
- Centre for Long-term Environmental Action in Nf/Ld
- For a New Earth
- Mercy for Animals
- NL-CAR
- Newfoundland and Labrador Wildlife Federation
- Port au Port Bay Fishery Committee
- Qalipu First Nations
- Salmonid Association of Eastern Newfoundland



**Pages 1660 to / à 1675
are withheld pursuant to section
sont retenues en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

From: Bradbury, Ian R
Sent: August-14-18 9:41 AM
To: Grant, Carole
Subject: RE: Latest version of Grieg SRR

" The Province has a continuous aquatic animal health surveillance program for hatcheries producing smolts for marine cage aquaculture that requires regular fish health testing. **Regular Fish health sampling should be maintained through all life history stages prior to authorization of entry to sea cages. Additionally, confirmatory triploid validation testing should be undertaken prior to authorization of entry to sea cages"**

FYI, draft copy of CSAS Science Response for Placentia Bay Atlantic Salmon Aquaculture Project. I guess Dale hasn't been around to get this document finalized and signed off.

Hi Carole – some small edits may be made but in a nutshell, this is the latest verison.

[illegible]

001676

White, Terrena

From: Bradbury, Ian R
Sent: August-14-18 9:43 AM
To: Grant, Carole
Subject: RE: Latest version of Grieg SRR

also:

Confidence in effective triploidy induction close to 100% will require further analysis to determine appropriate sample size and statistical power required to ensure acceptable triploid induction levels. **The current level of sampling to determine success of triploid induction is insufficient** (i.e., 10 eggs/ batch).

From: Grant, Carole
Sent: Tuesday, August 14, 2018 9:05 AM
To: Bradbury, Ian R; Dempson, Brian
Subject: FW: Latest version of Grieg SRR

FYI, draft copy of CSAS Science Response for Placentia Bay Atlantic Salmon Aquaculture Project. I guess Dale hasn't been around to get this document finalized and signed off.

From: Parrill, Erika
Sent: August-13-18 3:42 PM
To: Grant, Carole
Cc: Richards, Dale E
Subject: Latest version of Grieg SRR

Hi Carole – some small edits may be made but in a nutshell, this is the latest version.

><(((°>~><(((°>~><(((°>~><(((°>~><(((°>~><(((°>

Erika Parrill, M.A., B.A., B. Comm.
Science Advice Liaison
Centre for Science Advice – NL Region
709-727-6309

Decker, Shelley

From: Decker, Shelley
Sent: Tuesday, August 14, 2018 10:25 AM
To: Griffiths, Helen
Subject: RE: DFO direction requested

We did. I'll have a look.

Shelley

From: Griffiths, Helen
Sent: Tuesday, August 14, 2018 10:16 AM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: FW: DFO direction requested

Did we not tell them last week at meeting that we think there should be more explicit discussion around the potential ecological interactions between escaped farmed salmon and other fish species in the bay??? We acknowledge the list of species, species profiles, list of fisheries in the bay etc

Is the fisheries stuff in a Component Study?

From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: August-13-18 6:02 PM
To: Griffiths, Helen; Bieger, Tilman; Pilgrim, Bret; Decker, Shelley; Johnson, Roger; Grant, Carole
Cc: Squires, Susan
Subject: DFO direction requested

Hi All,

Clarification is requested on the following comment in DFO's August 10, 2018 letter to the EA Director (attached) regarding the EIS review:

"We remain of the view that additional information should be provided about the potential ecological impacts (such as through predation or competition) that an escape of a large number of farm salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic Salmon. We defer to the EA Committee and officials of your department to decide if and how this should be achieved."

I look forward to your response.

s.13(1)(c)

Regards,

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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Decker, Shelley

From: Decker, Shelley
Sent: Tuesday, August 14, 2018 1:33 PM
To: Griffiths, Helen
Subject: RE: DFO direction requested

Just back [REDACTED] They are all empty right now, I'll try and book the small one for ½ hour.

Shelley

From: Griffiths, Helen
Sent: Tuesday, August 14, 2018 1:22 PM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: RE: DFO direction requested

Im good now. either bdrm available?

From: Decker, Shelley
Sent: August-14-18 11:57 AM
To: Griffiths, Helen
Subject: RE: DFO direction requested

Let me know when you have some time to discuss this and the draft EIS recommendations. Thanks.

Shelley

From: Griffiths, Helen
Sent: Tuesday, August 14, 2018 10:16 AM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: FW: DFO direction requested

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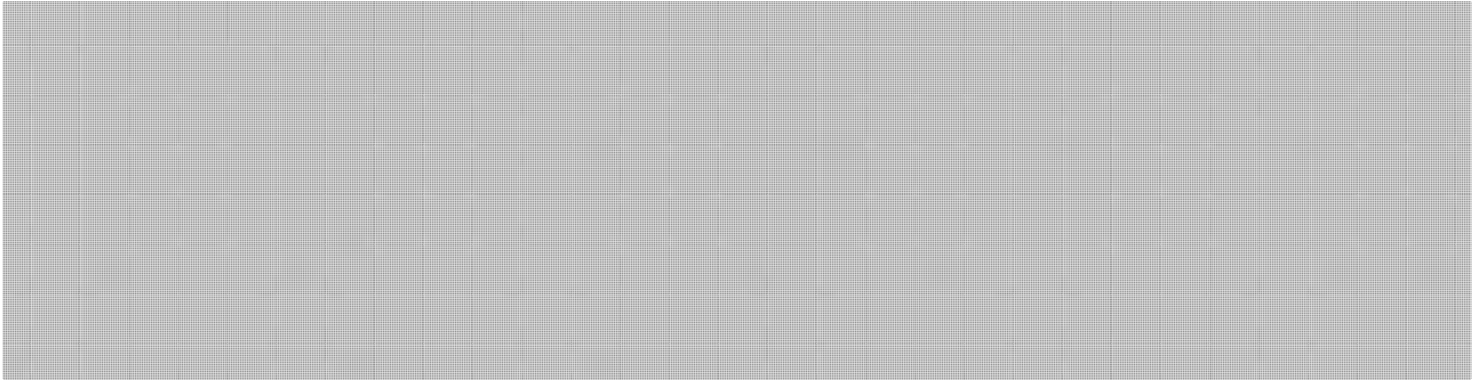
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From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: August-13-18 6:02 PM
To: Griffiths, Helen; Bieger, Tilman; Pilgrim, Bret; Decker, Shelley; Johnson, Roger; Grant, Carole
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Regards,

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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s.13(1)(c)

White, Terrena

From: Johnson, Roger
Sent: August-14-18 1:43 PM
To: Grant, Carole
Subject: letter
Attachments: Greig Letter DFO-Province July 27.pdf

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

**Pages 1683 to / à 1684
are duplicates of
sont des duplicatas des
pages 1457 to / à 1458**

Griffiths, Helen

From: Griffiths, Helen
Sent: August-14-18 3:16 PM
To: Sweeney, Joanne (joannesweeney@gov.nl.ca); Squires, Susan
Cc: Bieger, Tilman
Subject: RE: DFO direction requested

Hi Joanne

Based on the DFO's August 10 letter, to clarify the statements referenced in email below, [REDACTED]

There is no reference to conducting [REDACTED]
[REDACTED] in the August 10 letter.

Thanks
Helen

From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: August-13-18 6:02 PM
To: Griffiths, Helen; Bieger, Tilman; Pilgrim, Bret; Decker, Shelley; Johnson, Roger; Grant, Carole
Cc: Squires, Susan
Subject: DFO direction requested

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I look forward to your response.

Regards,

s.13(1)(c)

s.21(1)(b)

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

“This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender.”

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: August-14-18 12:42 PM
To: Davis, Ben
Subject: Could you call me [REDACTED] to follow up on the meeting on Grieg this morning pls

Thanks

s.16(2)(c)

Grant, Carole

From: Griffiths, Helen
Sent: Tuesday, August 14, 2018 4:05 PM
To: Grant, Carole; Johnson, Roger; Hendry, Christopher
Subject: FW: partial draft EIS recommendation
Attachments: 1834_draft EIS recommendation_13Aug18.doc

Hi
Please provide comments to me by noon tomorrow.....as tracked changes please 😊
Carole, this is more extensive than what you received on Friday, for comment by Monday noon (yesterday)
Thanks
Helen

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: August-13-18 9:12 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Griffiths, Helen
Cc: Squires, Susan
Subject: partial draft EIS recommendation

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**Pages 1689 to / à 1709
are duplicates of
sont des duplicatas des
pages 1655 to / à 1675**

Johnson, Roger

From: Hendry, Christopher
Sent: Wednesday, August 15, 2018 9:44 AM
To: Griffiths, Helen; Grant, Carole; Johnson, Roger
Subject: RE: partial draft EIS recommendation
Attachments: 1834_draft EIS recommendation_13Aug18 CH.doc

Some comments and corrections tracked.

I noticed Carole and I did not receive the latest email from the EAC Chair. Has there been a formal change to DFO's representation on the EAC?

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Government of Newfoundland and Labrador
Department of Municipal Affairs and Environment
Environmental Assessment Division

Registration 1834

MEMO TO: Honourable Andrew Parsons, Minister
Municipal Affairs and Environment

THROUGH: Jamie Chippett, Deputy Minister
Dana Spurrell, Assistant Deputy Minister
Susan Squires, Director, EA Division

FROM: Joanne Sweeney, Environmental Scientist, EA Division

DATE: August , 2018

SUBJECT: **Recommendation concerning the acceptability of the EIS
for the Placentia Bay Atlantic Salmon Aquaculture Project**

BACKGROUND

On February 19, 2016, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. registered the Placentia Bay Atlantic Salmon Aquaculture Project (the project) for environmental assessment in accordance with the *Environmental Protection Act (the Act)*. These companies are owned by Grieg NL Salmon Ltd. (the proponent), a private company registered in Newfoundland and Labrador. Grieg is 80% owned by the Norwegian based Grieg Group and 20% owned by the Newfoundland based Ocean Choice International (OCI).

The proponent plans to construct and operate a land-based Recirculation Aquaculture System (RAS) Hatchery for Atlantic salmon in the Marystown Marine Industrial Park, and marine-based farms in Placentia Bay. The land-based hatchery will be developed on approximately 10 hectares of serviced land and will produce up to seven million European-strain Atlantic salmon smolt per production cycle, for transfer to the marine-based component. The marine-based component will involve the operation of 11 seafarms located in four proposed Bay Management Areas (BMAs) within Placentia Bay: Rushoon, Merasheen, Red Island, and Long Harbour. Each seafarm will consist of multiple cages with cage collars at the surface and nets extending down to 43 meters. The northern region of Placentia Bay, surrounding the Merasheen Islands, encompasses an area of about 245,000 hectares. The four BMAs will occupy a total of 1,958 hectares, of which a total of 24 hectares will be occupied by seafarms. At peak, the seafarms will produce approximately 33,000 metric tonnes of live weight Atlantic salmon per production cycle. The development of the project, including the construction and operation of the hatchery and seafarms, will occur

over an eight year phased approach before reaching peak production. The proposal describes construction of the hatchery in year one, the first arrival of eggs in year two, production of smolt and operation of seafarms increasing from two million fish per year in year three to seven million fish per year in year seven. The first harvest of fish at peak production at the seafarms is anticipated to occur in year eight.

The minister was due to issue a decision to the proponent regarding the acceptability of the EIS by July 31, 2018, in order to meet the timeline prescribed by the *Environmental Assessment Regulations (EA Regs.)*, which require the decision to be issued to the proponent within 70 days of submission of the EIS document(s).

CHRONOLOGY

The Province carried out an environmental assessment of the project pursuant to the *Act* and the *EA Regs.* Specific phases of the assessment included:

- February 19, 2016 - project registered
- July 22, 2016 - minister released project subject to terms and conditions
- August 31 & September 29, 2016 – appeals of minister’s release decision
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INTERGOVERNMENTAL CONSULTATION

The EIS and associated documents were circulated to the EAC for review and the provision of scientific and technical project-related advice, as well as a recommendation as to whether or not the EIS is acceptable and whether or not the project can proceed in an environmentally acceptable manner. Provincial government departments represented on the EAC are:

- Department of Municipal Affairs and Environment (MAE)
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- Department of Fisheries and Land Resources (FLR)
 - Aquaculture Development Division (ADD)
 - Aquatic Animal Health Division (AAHD)
 - Forestry and Wildlife Branch (FWB)
- Department of Tourism, Culture, Industry, and Innovation (TCII)
 - Tourism Product Development (Tourism)

Federal government departments represented on the EAC are:

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- Health Canada (HC)
- Transport Canada (TC)

The Canadian Food Inspection Agency (CFIA) informed that they are available to participate in an advisory role, if needed.



s.13(1)(c)

PUBLIC CONSULTATION

An Environmental Assessment (EA) News Bulletin was published on the Government of Newfoundland and Labrador's web site and the Department of Municipal Affairs and Environment (MAE) web site on May 22, 2018, advising the public that the EIS had been submitted and requesting that public review comments be submitted within 50 days (by July 11, 2018). The EIS document, component studies, and associated appendices describing the proposed undertaking were posted on the MAE web site. A notification was sent to subscribers of the EA News Bulletin (includes environmental groups, media, government agencies, municipal organizations and interested members of the public) advising of the EIS submission and initiation of the public review period. The following Towns/ Communities in the vicinity of the proposed project area were advised of the EIS submission and the public review period:

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- Fortune
- Grand Bank
- Marystown
- Placentia
- Rushoon
- Southern Harbour
- St. Brides
- St. Lawrence

The public was engaged in the EIS review process, as emails/letters were received from 29 individuals and 17 groups in support of the project. Emails and letters expressing concern and opposition to the project were received from 87 individuals and 12 groups. Additionally, 423 copies of a form letter expressing concern and opposition to the project, each with an individual signature, were submitted during the public consultation period.

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- Harbour Grace Ocean Enterprises
- Long Harbour Development Association
- Pennecon
- Placentia West Development Association
- Town of Burin
- Town of Marystown
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- Burin Peninsula Chamber of Commerce
- Grand Bank Development Corporation

- Marystown Lions Club
- Town of Winterland

Groups expressing concern for and opposition to the project include:

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- Freshwater-Alexander Bays Ecosystem Corporation (FABEC)
- Atlantic Salmon Federation
- Centre for Long-term Environmental Action in Nf/Ld
- For a New Earth
- Mercy for Animals
- NL-CAR
- Newfoundland and Labrador Wildlife Federation
- Port au Port Bay Fishery Committee
- Qalipu First Nations
- Salmonid Association of Eastern Newfoundland

**Pages 1717 to / à 1720
are withheld pursuant to section
sont retenues en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1721

**is withheld pursuant to sections
est retenue en vertu des articles**

21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

**Pages 1722 to / à 1732
are withheld pursuant to section
sont retenues en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Decker, Shelley

From: Decker, Shelley
Sent: Wednesday, August 15, 2018 10:53 AM
To: Hendry, Christopher
Subject: RE: Grieg

Roger answered the question for me but thanks for getting back to me. [REDACTED]

Shelley

From: Hendry, Christopher
Sent: Wednesday, August 15, 2018 10:51 AM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: Re: Grieg

[REDACTED] You can call my cell [REDACTED]

----- Original message -----

From: "Decker, Shelley" <Shelley.Decker@dfo-mpo.gc.ca>
Date: 2018-08-14 14:05 (GMT-03:30)
To: "Hendry, Christopher" <Christopher.Hendry@dfo-mpo.gc.ca>
Cc:
Subject: Grieg

Hey Chris, I have a question related to Grieg. Let me know when you are available and I will pop out. Thanks.

Shelley

Shelley Decker

Fisheries Protection Biologist - Mining
Fisheries Protection Program, Ecosystems Management Branch
Northwest Atlantic Fisheries Centre
Fisheries and Oceans Canada
80 East White Hills Road, PO Box 5667
St. John's, NL, A1C 5X1
Shelley.Decker@dfo-mpo.gc.ca
Telephone (709) 772-8746
Government of Canada

s.16(2)(c)

s.19(1)

Johnson, Roger

From: Griffiths, Helen
Sent: Wednesday, August 15, 2018 1:53 PM
To: Hendry, Christopher; Johnson, Roger
Cc: Bieger, Tilman
Subject: RE: partial draft EIS recommendation

Chris

Your question on a comment on pg 10 was in the original set of comments from DFO to province EAC Chair July 12. I am guessing it was/will be in the CSAS document. While it may not be DFO mandate, someone felt it was appropriate to comment on.

Should we now request that the province delete the comment altogether?

Please advise

Thanks
Helen

From: Hendry, Christopher
Sent: August-15-18 9:44 AM
To: Griffiths, Helen; Grant, Carole; Johnson, Roger
Subject: RE: partial draft EIS recommendation

Some comments and corrections tracked.

I noticed Carole and I did not receive the latest email from the EAC Chair. Has there been a formal change to DFO's representation on the EAC?

Chris

From: Griffiths, Helen
Sent: August-14-18 4:05 PM
To: Grant, Carole; Johnson, Roger; Hendry, Christopher
Subject: FW: partial draft EIS recommendation

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Carole, this is more extensive than what you received on Friday, for comment by Monday noon (yesterday)
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Sent: August-13-18 9:12 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC)

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Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

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Decker, Shelley

From: Decker, Shelley
Sent: Wednesday, August 15, 2018 3:14 PM
To: Griffiths, Helen
Subject: RE: partial draft EIS recommendation

Done and saved to the shared drive. Just to make you aware, Chris' comment on page 10 is questioning whether or not we should be commenting on things we don't have a regulatory mandate for ([REDACTED]) and not a direct comment to the province.

Shelley

From: Griffiths, Helen
Sent: Wednesday, August 15, 2018 2:39 PM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: FW: partial draft EIS recommendation

s.21(1)(a)

s.21(1)(b)

Can you incorporate Chris edits into our version please? thanks

From: Hendry, Christopher
Sent: August-15-18 9:44 AM
To: Griffiths, Helen; Grant, Carole; Johnson, Roger
Subject: RE: partial draft EIS recommendation

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I noticed Carole and I did not receive the latest email from the EAC Chair. Has there been a formal change to DFO's representation on the EAC?

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Decker, Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 9:24 AM
To: Decker, Shelley
Subject: FW: partial draft EIS recommendation
Attachments: EIS recommendation_13Aug18-Salmonids.doc

Booked small bdrm with computer for 930, lets go through these and merge with our version

From: Grant, Carole
Sent: August-15-18 11:53 AM
To: Griffiths, Helen
Cc: Johnson, Roger; Hendry, Christopher
Subject: RE: partial draft EIS recommendation

Helen,

I had a quick read of the attached and offer the following suggested edits/comments. Most notably of course was [REDACTED]
[REDACTED]

Please contact me if you have any questions or wish to discuss further.

Thanks
Carole

s.21(1)(a)

s.21(1)(b)

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Government of Newfoundland and Labrador
Department of Municipal Affairs and Environment
Environmental Assessment Division

Registration 1834

MEMO TO: Honourable Andrew Parsons, Minister
Municipal Affairs and Environment

THROUGH: Jamie Chippett, Deputy Minister
Dana Spurrell, Assistant Deputy Minister
Susan Squires, Director, EA Division

FROM: Joanne Sweeney, Environmental Scientist, EA Division

DATE: August , 2018

SUBJECT: Recommendation concerning the acceptability of the EIS
for the Placentia Bay Atlantic Salmon Aquaculture Project

BACKGROUND

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- 2 -

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- * Salmonid Association of Eastern Newfoundland

s.13(1)(c)

**Pages 1745 to / à 1746
are withheld pursuant to section
sont retenues en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

**Pages 1747 to / à 1749
are withheld pursuant to sections
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21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1750

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est retenue en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1751

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est retenue en vertu des articles**

21(1)(b), 13(1)(c)

**of the Access to Information Act
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**Pages 1752 to / à 1755
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13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1756

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21(1)(b), 13(1)(c)

**of the Access to Information Act
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13(1)(c)

**of the Access to Information Act
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Decker, Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 10:09 AM
To: Decker, Shelley
Attachments: EIS recommendation_13Aug18-Salmonids.doc



Government of Newfoundland and Labrador
Department of Municipal Affairs and Environment
Environmental Assessment Division

Registration 1834

MEMO TO: Honourable Andrew Parsons, Minister
Municipal Affairs and Environment

THROUGH: Jamie Chippett, Deputy Minister
Dana Spurrell, Assistant Deputy Minister
Susan Squires, Director, EA Division

FROM: Joanne Sweeney, Environmental Scientist, EA Division

DATE: August , 2018

SUBJECT: **Recommendation concerning the acceptability of the EIS
for the Placentia Bay Atlantic Salmon Aquaculture Project**

BACKGROUND

On February 19, 2016, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. registered the Placentia Bay Atlantic Salmon Aquaculture Project (the project) for environmental assessment in accordance with the *Environmental Protection Act (the Act)*. These companies are owned by Grieg NL Salmon Ltd. (the proponent), a private company registered in Newfoundland and Labrador. Grieg is 80% owned by the Norwegian based Grieg Group and 20% owned by the Newfoundland based Ocean Choice International (OCI).

The proponent plans to construct and operate a land-based Recirculation Aquaculture System (RAS) Hatchery for Atlantic salmon in the Marystown Marine Industrial Park, and marine-based farms in Placentia Bay. The land-based hatchery will be developed on approximately 10 hectares of serviced land and will produce up to seven million European-strain Atlantic salmon smolt per production cycle, for transfer to the marine-based component. The marine-based component will involve the operation of 11 seafarms located in four proposed Bay Management Areas (BMAs) within Placentia Bay: Rushoon, Merasheen, Red Island, and Long Harbour. Each seafarm will consist of multiple cages with cage collars at the surface and nets extending down to 43 meters. The northern region of Placentia Bay, surrounding the Merasheen Islands, encompasses an area of about 245,000 hectares. The four BMAs will occupy a total of 1,958 hectares, of which a total of 24 hectares will be occupied by seafarms. At peak, the seafarms will produce approximately 33,000 metric tonnes of live weight Atlantic salmon per production cycle. The development of the project, including the construction and operation of the hatchery and seafarms, will occur

- 2 -

over an eight year phased approach before reaching peak production. The proposal describes construction of the hatchery in year one, the first arrival of eggs in year two, production of smolt and operation of seafarms increasing from two million fish per year in year three to seven million fish per year in year seven. The first harvest of fish at peak production at the seafarms is anticipated to occur in year eight.

The minister was due to issue a decision to the proponent regarding the acceptability of the EIS by July 31, 2018, in order to meet the timeline prescribed by the *Environmental Assessment Regulations (EA Regs.)*, which require the decision to be issued to the proponent within 70 days of submission of the EIS document(s).

CHRONOLOGY

The Province carried out an environmental assessment of the project pursuant to the *Act* and the *EA Regs.* Specific phases of the assessment included:

- February 19, 2016 - project registered
- July 22, 2016 - minister released project subject to terms and conditions
- August 31 & September 29, 2016 – appeals of minister’s release decision
- October 14 & October 19, 2016 – minister’s decisions announced to dismiss appeals
- July 20, 2017 - Supreme Court of Newfoundland and Labrador overturned minister’s release decision and ordered the completion of an EIS
- November 9, 2017 - minister advised proponent that an EIS is required.
- November 22, 2017 - minister appointed an environmental assessment committee (EAC) and the EAC drafted EIS guidelines for public review and comment
- March 8, 2018 - minister issued approved EIS guidelines to proponent within legislated timeline of 120 days after notifying the proponent of EIS requirement
- May 22, 2018 – minister acknowledged receipt of the EIS and initiated 50-day public and technical review
- July 11, 2018 – initial deadline for public EIS comments
- July 25, 2018 – extended deadline for public EIS comments
- July 31, 2018 – minister’s EIS acceptability decision was initially due
- August , 2018 – extended deadline for minister’s EIS decision

INTERGOVERNMENTAL CONSULTATION

The EIS and associated documents were circulated to the EAC for review and the provision of scientific and technical project-related advice, as well as a recommendation as to whether or not the EIS is acceptable and whether or not the project can proceed in an environmentally acceptable manner. Provincial government departments represented on the EAC are:


- Department of Municipal Affairs and Environment (MAE)
 - Environmental Assessment Division (EA Division)

- Pollution Prevention Division (PPD)
 - Water Resources Management Division (WRMD)
- Department of Fisheries and Land Resources (FLR)
 - Aquaculture Development Division (ADD)
 - Aquatic Animal Health Division (AAHD)
 - Forestry and Wildlife Branch (FWB)
- Department of Tourism, Culture, Industry, and Innovation (TCII)
 - Tourism Product Development (Tourism)

Federal government departments represented on the EAC are:

- Fisheries and Oceans Canada (DFO)
- Environment and Climate Change Canada (ECCC)
- Health Canada (HC)
- Transport Canada (TC)

The Canadian Food Inspection Agency (CFIA) informed that they are available to participate in an advisory role, if needed.



PUBLIC CONSULTATION

An Environmental Assessment (EA) News Bulletin was published on the Government of Newfoundland and Labrador's web site and the Department of Municipal Affairs and Environment (MAE) web site on May 22, 2018, advising the public that the EIS had been submitted and requesting that public review comments be submitted within 50 days (by July 11, 2018). The EIS document, component studies, and associated appendices describing the proposed undertaking were posted on the MAE web site. A notification was sent to subscribers of the EA News Bulletin (includes environmental groups, media, government agencies, municipal organizations and interested members of the public) advising of the EIS submission and initiation of the public review period. The following Towns/-Communities in the vicinity of the proposed project area were advised of the EIS submission and the public review period:

- Burin
- Fortune
- Grand Bank
- Marystown
- Placentia
- Rushoon
- Southern Harbour
- St. Brides
- St. Lawrence

The public was engaged in the EIS review process, as emails/letters were received from 29 individuals and 17 groups in support of the project. Emails and letters expressing concern and opposition to the project were received from 87 individuals and 12 groups. Additionally, 423 copies of a form letter expressing concern and opposition to the project, each with an individual signature, were submitted during the public consultation period.

Groups expressing support for the project include:

- Newfoundland Aquaculture Industry Association (NAIA)
- Keyin College, Burin Peninsula
- Newfoundland Styro
- Burin Peninsula Joint Council
- Edwards & Associates Ltd.
- Eimskip Canada
- Harbour Grace Ocean Enterprises
- Long Harbour Development Association
- Pennecon
- Placentia West Development Association
- Town of Burin
- Town of Marystown
- Building Trades of Newfoundland and Labrador (Trades NL)
- Burin Peninsula Chamber of Commerce
- Grand Bank Development Corporation

- Marystown Lions Club
- Town of Winterland

Groups expressing concern for and opposition to the project include:

- FFAW-Unifor
- Freshwater-Alexander Bays Ecosystem Corporation (FABEC)
- Atlantic Salmon Federation
- Centre for Long-term Environmental Action in Nf/Ld
- For a New Earth
- Mercy for Animals
- NL-CAR
- Newfoundland and Labrador Wildlife Federation
- Port au Port Bay Fishery Committee
- Qalipu First Nations
- Salmonid Association of Eastern Newfoundland

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13(1)(c)

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Page 1770

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21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1771

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13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1772

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21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1773

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13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1774

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21(1)(b), 13(1)(c)

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13(1)(c)

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21(1)(b), 13(1)(c)

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13(1)(c)

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de la Loi sur l'accès à l'information**

Griffiths, Helen

From: Griffiths, Helen
Sent: August-16-18 8:59 AM
To: Sweeney, Joanne (joannesweeney@gov.nl.ca)
Subject: FW: methodology

From: Grant, Carole
Sent: August-15-18 10:25 PM
To: Griffiths, Helen
Subject: RE: methodology

What we need specifically are results of the triploidy testing that the company has already completed in order to validate the predictions being made in the EIS (i.e., we need them to justify the sample sizes they used, namely 10 eggs/batch, and include an analysis of statistical power to demonstrate that they have the capacity to accurately estimate the level of triploidy achieved).

We also need a commitment that there will be repeated testing particularly before fish are transported to cage sites to ensure that predicted level of triploidy has been achieved.

From: Griffiths, Helen
Sent: August 15, 2018 6:41 PM
To: Grant, Carole
Subject: Fw: methodology

Hi Carole
Can u answer Joanne's question on methodology, please?
Thanks
Helen

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: Wednesday, August 15, 2018 5:08 PM
To: Griffiths, Helen
Subject: methodology

Procedures on Triploid Induction and Verification are described in section 5.0 of appendix I and in the footnote, pg 4. Is this sufficient to describe methodology? Statistical validation still needed.

Joanne
709.729.2822

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Griffiths, Helen

From: EA Project Comments <EAProjectComments@gov.nl.ca>
Sent: August-16-18 9:47 AM
To: Griffiths, Helen
Cc: Squires, Susan
Subject: RE: DFO review- Grieg Aquaculture EIS
Attachments: EA review_DFO Aug 10-2018.docx

Hi Helen,

Thank you for the DFO EIS review comments submitted on August 10, 2018. As recently discussed, I'm requesting written clarity on the two comments DFO has provided under the "Potential EEMP" heading. Please provide context as to how this monitoring may be carried out by an aquaculture operator, or whether these comments may be better dealt with by some other means (i.e. at the industry level).

Regards,

Joanne

Joanne Sweeney

Environmental Assessment Division
Department of Municipal Affairs and Environment
PO Box 8700, St. John's NL A1B 4J6
Tel. (709) 729-2822

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Friday, August 10, 2018 11:56 AM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Cc: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>; Squires, Susan <SusanSquires@gov.nl.ca>
Subject: DFO review- Grieg Aquaculture EIS

Hi Joanne

Please see attached, as discussed at our last meeting, and follow up to letter sent earlier.
Any questions, give me a call.

Thanks
Helen

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**Pages 1787 to / à 1788
are duplicates of
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pages 1524 to / à 1525**

Grant, Carole

From: Davis, Ben
Sent: Thursday, August 16, 2018 10:00 AM
To: Grant, Carole
Subject: FW: Grieg EA and thge triploid issue

Has she been working with you?

From: Bieger, Tilman
Sent: August-16-18 9:25 AM
To: Davis, Ben
Subject: RE: Grieg EA and thge triploid issue

Helen has been working closely with Carole to make sure appropriate recommendations about that are reflected along the lines we discussed

From: Davis, Ben
Sent: August-16-18 9:19 AM
To: Bieger, Tilman
Cc: Grant, Carole
Subject: Grieg EA and thge triploid issue

Tilman,

Any updates on whether the triploid issue was captured in the final documentation for the EA?

Ben Davis, Ph.D
Division Manager, Aquatic Resources
Science Branch, Fisheries and Oceans Canada
80 East White Hills Road
P.O. Box 5667, St. John's NL A1C 5X1
(709) 691-4260 // fax/télécopieur (709) 772-6100
ben.davis@dfo-mpo.gc.ca
Direction des Sciences
C.P. 5667, St. Jean TNL A1C 5X1
Government of Canada/Gouvernement du Canada
\\

Bieger, Tilman

From: Bieger, Tilman
Sent: August-16-18 10:00 AM
To: Johnson, Roger; Griffiths, Helen
Subject: FW: Grieg EA and thge triploid issue

Sensitivity: Confidential

FYI

From: Bieger, Tilman
Sent: August-16-18 9:25 AM
To: Davis, Ben
Subject: RE: Grieg EA and thge triploid issue

Helen has been working closely with Carole to make sure appropriate recommendations about that are reflected along the lines we discussed

From: Davis, Ben
Sent: August-16-18 9:19 AM
To: Bieger, Tilman
Cc: Grant, Carole
Subject: Grieg EA and thge triploid issue

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Any updates on whether the triploid issue was captured in the final documentation for the EA?

Ben Davis, Ph.D
Division Manager, Aquatic Resources
Science Branch, Fisheries and Oceans Canada
80 East White Hills Road
P.O. Box 5667, St. John's NL A1C 5X1
(709) 691-4260 // fax/télécopieur (709) 772-6100
ben.davis@dfo-mpo.gc.ca
Direction des Sciences
C.P. 5667, St. Jean TNL A1C 5X1
Government of Canada/Gouvernement du Canada
\\

Bieger, Tilman

From: Bieger, Tilman
Sent: August-16-18 10:02 AM
To: Johnson, Roger
Subject: FW: URGENT INFORMAL: Grieg EIS

As we just discussed

I didn't want to bother you while [REDACTED] – but should have shared this with you on your return

From: Pike, Kelly J
Sent: July-31-18 11:55 AM
To: Butcher, Ashley
Cc: Perry, Jacqueline; Butler, Annette; Bieger, Tilman; Griffiths, Helen; Kahn, Zoe; Jarjour, Jasmine; Malko, Carol; Khwaja, Saba; Finn, Ray
Subject: FW: URGENT INFORMAL: Grieg EIS

Ashley, as requested please see information below as approved by Jacqueline Perry, RDG-NL Region.

If you need anything further please let me know.

Kelly
On Behalf of Annette Butler

From: Perry, Jacqueline
Sent: Tuesday, July 31, 2018 11:47 AM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>; Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: RE: URGENT INFORMAL: Grieg EIS

Approved

From: Bieger, Tilman
Sent: Tuesday, July 31, 2018 11:30 AM
To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Subject: RE: URGENT INFORMAL: Grieg EIS
Importance: High

Hello Jackie, Annette

Please let me know if this needs to be condensed.

Tilman

- DFO is participating in the Committee established by the Province of NL to review the Environmental Impact Statement (EIS) for the aquaculture project proposed by Grieg NL in Placentia Bay. A key role of that committee is to pronounce on the “acceptability” of the EIS.
- To inform the advice we provided to the Committee, the Department held a scientific review process involving some 10 DFO scientists in the NL Region in June 2018. This review identified a number of areas in which the EIS did not adequately or properly characterize the environment and potential risks of the project, particularly in terms of the possible impacts of escaped farm salmon on wild salmon stocks.
- Based on this scientific advice, the Department recommended to the Committee on July 12 some 90 instances in which the EIS should be modified by providing clarification or additional information.
- In subsequent meetings it was determined that a number of these instances could be resolved during the post-EA regulatory process. There are however a number of recommendations remaining that need to be addressed in order for the Department to accept that the EIS properly describes the potential impacts of the project. Addressing these recommendations would not require the proponent to carry out any additional studies or research – they could all be addressed by the proponent incorporating or referencing existing information.
- It is our understanding that in order for Grieg NL to provide this additional information, the Province would have to declare the EIS deficient, which would trigger an additional 50-day review period. There have been assertions that this would unnecessarily delay the project start.
- We understand that some other regulatory authorities and some stakeholder groups have expressed concerns about some of the same elements in the EIS that we have.
- The Department is not fundamentally opposed to the project, and believes it could proceed, provided that appropriate mitigations and monitoring are implemented. However, to support evidence based decision-making by the Province and to protect our credibility, it is important that our advice to the Province incorporate and address key recommendations from our scientific review.
- Regional DFO personnel will continue to work closely with officials of the Province of NL and the representatives of Grieg NL to clarify and prioritise the information that is needed to ensure the EIS meets an acceptable standard of scientific rigour. The actual number of key issues to be clarified will likely be significantly less than the 90 initially identified.

From: Butler, Annette
Sent: Monday, July 30, 2018 8:43 PM
To: Bieger, Tilman; Finn, Ray
Cc: Pike, Kelly J; Perry, Jacqueline
Subject: Fw: URGENT INFORMAL: Grieg EIS

Hi Tilman,

Can you please draft a response to this request for RDG approval.

DUE RDGO: ASAP

Thank you,

Annette

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butcher, Ashley <Ashley.Butcher@dfo-mpo.gc.ca>
Sent: Monday, July 30, 2018 8:41 PM
To: Butler, Annette
Cc: Kahn, Zoe; Jarjour, Jasmine; Malko, Carol; Khwaja, Saba
Subject: URGENT INFORMAL: Grieg EIS

Hi Annette -

MINO received an inquiry from PMO, who had been contacted by the province of NL on this issue. They're looking for information from the Department before noon, Tuesday:

An inquiry from the province was received asking what additional information DFO requires for the Grieg EIS and potential impacts on wild salmon? Could the Department please provide more information on this?

Thanks!

Ashley

Bieger, Tilman

From: Bieger, Tilman
Sent: August-16-18 10:07 AM
To: Finn, Ray
Subject: RE: Grieg NL update

No problem

There are dozens of other messages on this and other files

I figured I would just include you at key points but I can send more if you prefer

From: Finn, Ray
Sent: August-16-18 7:49 AM
To: Bieger, Tilman
Subject: Re: Grieg NL update

Thanks for keeping me in the loop on this important file.
Much appreciated

Ray

 (cell)
(709) 772 - 2442. (office)

Sent via Blackberry

From: Bieger, Tilman
Sent: Wednesday, August 15, 2018 4:23 PM
To: Perry, Jacqueline; Abbass, Lily
Cc: Butler, Annette; Finn, Ray; Kennedy, Lori; Hamel, Anne-Marie
Subject: Grieg NL update

To keep you in the loop on the Grieg project:

We are interacting with company officials and their consultants – for example see message below about advice for them on their development of an Environmental Effects Monitoring Program.

We are also interacting intensively with contacts at the provincial EA Division to help them finalize their advice to the provincial Minister of Municipal Affairs and Environment for the project.

Tilman

From: Bieger, Tilman
Sent: August-15-18 4:15 PM
To:  Griffiths, Helen

s.16(2)(c)
s.19(1)

Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

[REDACTED]
I am sure that a meeting is possible.

Helen Griffiths (acting as Manager, Fisheries Protection Program – Regulatory Review) is the central contact in our Department for this project at this time – I will ask her to follow up with you and others as appropriate to discuss and arrange a time.

Regards,

Tilman Bieger
A/RD, Ecosystems Management – NL

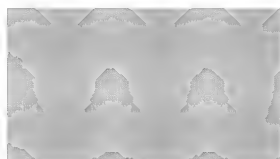
Acting Director – Oceans Management | Directeur Intérimaire, Gestion des Océans
Ecosystems Management | Gestion des écosystèmes
Fisheries & Oceans Canada | Pêches et Océans Canada
NL Region | Région de Terre Neuve
Office | Bureau (709) 772-8737
Cell | Tél. cellulaire (709) 772-8737
Fax | Télécopieur (709) 772-7862

From: [REDACTED]
Sent: August-15-18 1:13 PM
To: Bieger, Tilman
Cc: [REDACTED]
Subject: Meeting to discuss Grieg NL EEMP

Good afternoon Tilman,

LGL is currently helping Grieg NL prepare the Environmental Effects Monitoring and Follow-up Plan associated with Grieg NL's proposed Placentia Bay aquaculture project. We are hoping to meet with you and/or relevant DFO personnel next week to discuss the EEMP to date. Is such a meeting possible for either the afternoon of Tuesday August 21 or anytime on Wednesday August 22? It is our intention to provide a copy of the EEMP document to you by end of day Monday August 20. Please advise.

Thanks you.



LGL Limited
388 Kenmount Road
PO Box 13248, Stn. A
St. John's, NL
A1C 4A5

s.16(2)(c)
s.19(1)

Office phone: 709-754-1992

Cell phone: [REDACTED]

Fax: 709-754-7718

s.19(1)

No further information has been removed or severed from this page

Decker, Shelley

From: Decker, Shelley
Sent: Thursday, August 16, 2018 10:58 AM
To: Griffiths, Helen
Subject: RE: Greig Aquaculture Letter

Done.

Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 10:55 AM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: RE: Greig Aquaculture Letter

Yes please. then I'll send to province

From: Decker, Shelley
Sent: August-16-18 10:53 AM
To: Griffiths, Helen
Subject: RE: Greig Aquaculture Letter

I agree, it was meant to be all encompassing for all species, not just wild Atlantic salmon. Want me to remove "wild Atlantic salmon populations"?

Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 10:41 AM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: FW: Greig Aquaculture Letter

Pg 8 of comments..... She included "wild Atlantic salmon populations", pretty sure the comment in the letter was meant to be about ecological interactions, not just salmon. July 27 letter attached

From: Pilgrim, Bret
Sent: July-27-18 4:34 PM
To: Johnson, Roger
Cc: Bieger, Tilman; Griffiths, Helen
Subject: FW: Greig Aquaculture Letter

FYI – See attached/email below

From: Pilgrim, Bret
Sent: July-27-18 4:33 PM
To: Squires, Susan

Cc: joannesweeney@gov.nl.ca

Subject: Greig Aquaculture Letter

Ms. Squires,

Please see the attached letter in relation to recent correspondence regarding the proposed Placentia Bay Atlantic Salmon Aquaculture Project.

Regards,

Bret

Bret Pilgrim

Fisheries Protection Biologist
Fisheries Protection Program | Programme de protection des pêches
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans Canada | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre |
Centre des Pêches de l'Atlantique Nord-Ouest
80 East White Hills Road | 80, route White Hills est
PO Box 5667 | CP 5667
St. John's NL A1C 5X1 Canada
Tel. 709-772-6562

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sont des duplicatas des
pages 1457 to / à 1458**

Decker, Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 11:17 AM
To: Decker, Shelley; Pilgrim, Bret
Subject: FW: partial draft EIS recommendation
Attachments: DFO Response - 1834_draft EIS recommendation_13Aug18.doc.docx

PATH SAPH NO: 16-HNFL-00041

Should this go in PATH?

From: Griffiths, Helen
Sent: August-16-18 11:03 AM
To: 'Sweeney, Joanne'
Cc: Bieger, Tilman
Subject: RE: partial draft EIS recommendation

Hi Joanne
See attached for DFO comments.
Any questions, let me know.

Thanks
Helen

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: August-13-18 9:12 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Griffiths, Helen
Cc: Squires, Susan
Subject: partial draft EIS recommendation

Hi All,

I've attached a partial draft of the EIS recommendation to the minister. Please review the **EAC SCIENTIFIC AND TECHNICAL REVIEW COMMENTS**, which should reflect/summarize the EIS review comments you forwarded to me. Also, review my **ANALYSIS OF EAC SCIENTIFIC AND TECHNICAL REVIEW COMMENTS for accuracy**. Feel free to make revisions in track changes and call me if there's anything you'd like to discuss.

Regards,

Joanne

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

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Government of Newfoundland and Labrador
Department of Municipal Affairs and Environment
Environmental Assessment Division

Style Definition: List Bullet: Tab stops: Not at 0.25"

Registration 1834

MEMO TO: Honourable Andrew Parsons, Minister
Municipal Affairs and Environment

THROUGH: Jamie Chippett, Deputy Minister
Dana Spurrell, Assistant Deputy Minister
Susan Squires, Director, EA Division

FROM: Joanne Sweeney, Environmental Scientist, EA Division

DATE: August , 2018

SUBJECT: Recommendation concerning the acceptability of the EIS
for the Placentia Bay Atlantic Salmon Aquaculture Project

BACKGROUND

On February 19, 2016, Grieg NL Nurseries Ltd. and Grieg NL Seafarms Ltd. registered the Placentia Bay Atlantic Salmon Aquaculture Project (the project) for environmental assessment in accordance with the *Environmental Protection Act (the Act)*. These companies are owned by Grieg NL Salmon Ltd. (the proponent), a private company registered in Newfoundland and Labrador. Grieg is 80% owned by the Norwegian based Grieg Group and 20% owned by the Newfoundland based Ocean Choice International (OCI).

The proponent plans to construct and operate a land-based Recirculation Aquaculture System (RAS) Hatchery for Atlantic salmon in the Marystown Marine Industrial Park, and marine-based farms in Placentia Bay. The land-based hatchery will be developed on approximately 10 hectares of serviced land and will produce up to seven million European-strain Atlantic salmon smolt per production cycle, for transfer to the marine-based component. The marine-based component will involve the operation of 11 seafarms located in four proposed Bay Management Areas (BMAs) within Placentia Bay: Rushoon, Merasheen, Red Island, and Long Harbour. Each seafarm will consist of multiple cages with cage collars at the surface and nets extending down to 43 meters. The northern region of Placentia Bay, surrounding the Merasheen Islands, encompasses an area of about 245,000 hectares. The four BMAs will occupy a total of 1,958 hectares, of which a total of 24 hectares will be occupied by seafarms. At peak, the seafarms will produce approximately 33,000 metric tonnes of live weight Atlantic salmon per production cycle. The development of the project, including the construction and operation of the hatchery and seafarms, will occur

- 2 -

over an eight year phased approach before reaching peak production. The proposal describes construction of the hatchery in year one, the first arrival of eggs in year two, production of smolt and operation of seafarms increasing from two million fish per year in year three to seven million fish per year in year seven. The first harvest of fish at peak production at the seafarms is anticipated to occur in year eight.

The minister was due to issue a decision to the proponent regarding the acceptability of the EIS by July 31, 2018, in order to meet the timeline prescribed by the *Environmental Assessment Regulations (EA Regs.)*, which require the decision to be issued to the proponent within 70 days of submission of the EIS document(s).

CHRONOLOGY

The Province carried out an environmental assessment of the project pursuant to the *Act* and the *EA Regs.* Specific phases of the assessment included:

- February 19, 2016 - project registered
- July 22, 2016 - minister released project subject to terms and conditions
- August 31 & September 29, 2016 – appeals of minister’s release decision
- October 14 & October 19, 2016 – minister’s decisions announced to dismiss appeals
- July 20, 2017 - Supreme Court of Newfoundland and Labrador overturned minister’s release decision and ordered the completion of an EIS
- November 9, 2017 - minister advised proponent that an EIS is required.
- November 22, 2017 - minister appointed an environmental assessment committee (EAC) and the EAC drafted EIS guidelines for public review and comment
- March 8, 2018 - minister issued approved EIS guidelines to proponent within legislated timeline of 120 days after notifying the proponent of EIS requirement
- May 22, 2018 – minister acknowledged receipt of the EIS and initiated 50-day public and technical review
- July 11, 2018 – initial deadline for public EIS comments
- July 25, 2018 – extended deadline for public EIS comments
- July 31, 2018 – minister’s EIS acceptability decision was initially due
- August , 2018 – extended deadline for minister’s EIS decision

INTERGOVERNMENTAL CONSULTATION

The EIS and associated documents were circulated to the EAC for review and the provision of scientific and technical project-related advice, as well as a recommendation as to whether or not the EIS is acceptable and whether or not the project can proceed in an environmentally acceptable manner. Provincial government departments represented on the EAC are:

- Department of Municipal Affairs and Environment (MAE)
 - Environmental Assessment Division (EA Division)

- Pollution Prevention Division (PPD)
- Water Resources Management Division (WRMD)
- Department of Fisheries and Land Resources (FLR)
 - Aquaculture Development Division (ADD)
 - Aquatic Animal Health Division (AAHD)
 - Forestry and Wildlife Branch (FWB)
- Department of Tourism, Culture, Industry, and Innovation (TCII)
 - Tourism Product Development (Tourism)

Federal government departments represented on the EAC are:

- Fisheries and Oceans Canada (DFO)
- Environment and Climate Change Canada (ECCC)
- Health Canada (HC)
- Transport Canada (TC)

The Canadian Food Inspection Agency (CFIA) informed that they are available to participate in an advisory role, if needed.



s.13(1)(c)

PUBLIC CONSULTATION

An Environmental Assessment (EA) News Bulletin was published on the Government of Newfoundland and Labrador's web site and the Department of Municipal Affairs and Environment (MAE) web site on May 22, 2018, advising the public that the EIS had been submitted and requesting that public review comments be submitted within 50 days (by July 11, 2018). The EIS document, component studies, and associated appendices describing the proposed undertaking were posted on the MAE web site. A notification was sent to subscribers of the EA News Bulletin (includes environmental groups, media, government agencies, municipal organizations and interested members of the public) advising of the EIS submission and initiation of the public review period. The following Towns/-Communities in the vicinity of the proposed project area were advised of the EIS submission and the public review period:

- Burin
- Fortune
- Grand Bank
- Marystown
- Placentia
- Rushoon
- Southern Harbour
- St. Brides
- St. Lawrence

The public was engaged in the EIS review process, as emails/letters were received from 29 individuals and 17 groups in support of the project. Emails and letters expressing concern and opposition to the project were received from 87 individuals and 12 groups. Additionally, 423 copies of a form letter expressing concern and opposition to the project, each with an individual signature, were submitted during the public consultation period.

Groups expressing support for the project include:

- Newfoundland Aquaculture Industry Association (NAIA)
- Keyin College, Burin Peninsula
- Newfoundland Styro
- Burin Peninsula Joint Council
- Edwards & Associates Ltd.
- Eimskip Canada
- Harbour Grace Ocean Enterprises
- Long Harbour Development Association
- Pennecon
- Placentia West Development Association
- Town of Burin
- Town of Marystown
- Building Trades of Newfoundland and Labrador (Trades NL)
- Burin Peninsula Chamber of Commerce
- Grand Bank Development Corporation

- Marystown Lions Club
- Town of Winterland

Groups expressing concern for and opposition to the project include:

- FFAW-Unifor
- Freshwater-Alexander Bays Ecosystem Corporation (FABEC)
- Atlantic Salmon Federation
- Centre for Long-term Environmental Action in Nf/Ld
- For a New Earth
- Mercy for Animals
- NL-CAR
- Newfoundland and Labrador Wildlife Federation
- Port au Port Bay Fishery Committee
- Qalipu First Nations
- Salmonid Association of Eastern Newfoundland



s.13(1)(c)

**Pages 1808 to / à 1809
are withheld pursuant to section
sont retenues en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

**Pages 1810 to / à 1812
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sont retenues en vertu des articles**

21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1813

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est retenue en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1814

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est retenue en vertu des articles**

21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

**Pages 1815 to / à 1816
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13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

**Pages 1817 to / à 1820
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sont retenues en vertu des articles**

21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1821

**is withheld pursuant to section
est retenue en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1822

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21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

**Pages 1823 to / à 1824
are withheld pursuant to section
sont retenues en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Decker, Shelley

From: Decker, Shelley
Sent: Thursday, August 16, 2018 11:21 AM
To: Griffiths, Helen
Subject: RE: partial draft EIS recommendation

Yes, I will upload it.

Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 11:17 AM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>; Pilgrim, Bret <Bret.Pilgrim@dfo-mpo.gc.ca>
Subject: FW: partial draft EIS recommendation

Should this go in PATH?

From: Griffiths, Helen
Sent: August-16-18 11:03 AM
To: 'Sweeney, Joanne'
Cc: Bieger, Tilman
Subject: RE: partial draft EIS recommendation

Hi Joanne
See attached for DFO comments.
Any questions, let me know.

Thanks
Helen

From: Sweeney, Joanne [<mailto:joannesweeney@gov.nl.ca>]
Sent: August-13-18 9:12 PM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca); Griffiths, Helen
Cc: Squires, Susan
Subject: partial draft EIS recommendation

Hi All,

I've attached a partial draft of the EIS recommendation to the minister. Please review the **EAC SCIENTIFIC AND TECHNICAL REVIEW COMMENTS**, which should reflect/summarize the EIS review comments you forwarded to me. Also, review my **ANALYSIS OF EAC SCIENTIFIC AND TECHNICAL REVIEW COMMENTS for accuracy**. Feel free to make revisions in track changes and call me if there's anything you'd like to discuss.

Regards,

Joanne

Joanne Sweeney

Project EAC Chair

Environmental Assessment Division

Tel. (709) 729-2822

“This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender.”

No information has been removed or severed from this page

Decker, Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 3:50 PM
To: Decker, Shelley
Subject: FW: partial draft EIS recommendation
Attachments: DFO Response - 1834_draft EIS recommendation_13Aug18.doc.docx

Sounds like not much to respond back with. Can u take a look and confirm what clarifications we should provide, and check and see if we did say "DFO will limit ADVICE....."

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: August-16-18 1:02 PM
To: Griffiths, Helen
Subject: RE: partial draft EIS recommendation

Hi Helen,

Thanks for the review comments. I've made some comments next to DFO's to provide clarity. I have a question for the final DFO comment made by Shelley. Would you/Shelley have a look at it and clarify so I delete the correct paragraphs?

Joanne
709.729.2822

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Government of Newfoundland and Labrador
Department of Municipal Affairs and Environment
Environmental Assessment Division

Style Definition: List Bullet: Tab stops: Not at 0.25"

Registration 1834

MEMO TO: Honourable Andrew Parsons, Minister
Municipal Affairs and Environment

THROUGH: Jamie Chippett, Deputy Minister
Dana Spurrell, Assistant Deputy Minister
Susan Squires, Director, EA Division

FROM: Joanne Sweeney, Environmental Scientist, EA Division

DATE: August, 2018

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BACKGROUND

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- 2 -

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- Newfoundland Styro
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- Long Harbour Development Association
- Pennecon
- Placentia West Development Association
- Town of Burin
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- Mercy for Animals
- NL-CAR
- Newfoundland and Labrador Wildlife Federation
- Port au Port Bay Fishery Committee
- Qalipu First Nations
- Salmonid Association of Eastern Newfoundland

**Pages 1833 to / à 1834
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13(1)(c)

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21(1)(b), 13(1)(c)

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de la Loi sur l'accès à l'information**

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13(1)(c)

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21(1)(b), 13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Page 1848

**is withheld pursuant to section
est retenue en vertu de l'article**

13(1)(c)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

Griffiths, Helen

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: August-16-18 5:20 PM
To: Griffiths, Helen
Subject: RE: partial draft EIS recommendation

No problem. I'll call you in the afternoon. Good meeting today ☺

Joanne

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Thursday, August 16, 2018 4:21 PM
To: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Subject: RE: partial draft EIS recommendation

One comment left to clarify. We'll chat tomorrow. I'm leaving for the day

From: Sweeney, Joanne [mailto:joannesweeney@gov.nl.ca]
Sent: August-16-18 1:02 PM
To: Griffiths, Helen
Subject: RE: partial draft EIS recommendation

Hi Helen,

Thanks for the review comments. I've made some comments next to DFO's to provide clarity. I have a question for the final DFO comment made by Shelley. Would you/Shelley have a look at it and clarify so I delete the correct paragraphs?

Joanne
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Decker, Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 9:54 PM
To: Decker, Shelley
Subject: Fw: MP form Grieg
Attachments: Grieg-MP-inquiryform-August 13, 2018 complete.docx

This was one Roger did on Monday

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Sent: Monday, August 13, 2018 3:31 PM
To: Bieger, Tilman
Cc: Griffiths, Helen; Hendry, Christopher; Decker, Shelley
Subject: MP form Grieg

Please see attached.

You may recognize some of the wording.

Wanted to keep it simple, especially considering Jackie has extensive background info from the last 4-5 weeks

Roger Johnson
Sr. Biologist - Mining
Fisheries Protection Program
Dept. of Fisheries and Oceans
Telephone: (709)772-3296 (O) [REDACTED] (cell)
E-mail: Roger.Johnson@dfo-mpo.gc.ca

s.16(2)(c)

**Pages 1851 to / à 1856
are duplicates of
sont des duplicatas des
pages 1612 to / à 1617**

Decker, Shelley

From: Decker, Shelley
Sent: Friday, August 17, 2018 10:44 AM
To: Griffiths, Helen
Subject: RE: Checking in
Attachments: Grieg-MP-inquiryform-August 17, 2018.docx

Just in case you need this to send to Tilman. Also on the shared drive.

Shelley

From: Griffiths, Helen
Sent: Thursday, August 16, 2018 9:18 PM
To: Decker, Shelley <Shelley.Decker@dfo-mpo.gc.ca>
Subject: Fw: Checking in

Can u start drafting MP inquiry template according to msg below please. Small bit of background from last week or so.

We provided comments, been communicating with provincial officials throughout, etc
Might be some wording in letters of July 27 and Aug 10 we can use

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Sent: Thursday, August 16, 2018 5:42 PM
To: Griffiths, Helen
Subject: RE: Checking in

Helen I wonder is this request being driven by anything that arose out of the meeting today?

It would be good for us to be able to communicate that we've provided our final advice now, that we consider that all of the issues we raised could be addressed after an EA decision is made, and that the Province is working on ways to do that.

Available to discuss

From: Pike, Kelly J
Sent: August-16-18 4:46 PM
To: Griffiths, Helen
Cc: Johnson, Roger; Bieger, Tilman
Subject: FW: Checking in
Importance: High

Helen,

Please provide input using attached MP inquiry form (note 24 hour required for MP Inquiries)

Also, attached recent submission for reference.

Kelly

From: Butler, Annette
Sent: Thursday, August 16, 2018 4:39 PM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>
Subject: FW: Checking in

Please see below for your review/action. Please route through the RDGO for approval.

Note the turnaround time for MP Inquiries is 24 hours.

Thank you,
Kim

From: Abbass, Lily
Sent: 2018–August-16 4:25 PM
To: Butler, Annette
Subject: Re: Checking in

Go ahead. They should treat it as an MP enquiry as they did before.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butler, Annette
Sent: Thursday, August 16, 2018 4:15 PM
To: Abbass, Lily
Subject: FW: Checking in

Shall I task to EM?

K

From: Rogers, Churence - Assistant 1 [<mailto:Churence.Rogers.A1@parl.gc.ca>]
Sent: 2018–August-16 3:31 PM
To: Perry, Jacqueline
Subject: Checking in

Hi Jackie,
Would you have a moment to chat? Churence wanted me to reach out to you as he was hoping for a quick update on Grieg?

Thanks,
Barb

Barbara Crann
Executive Assistant~
MP Churence Rogers
Bonavista-Burin-Trinity



Directives Concerning Political Representatives' Requests for Information

1. Definitions:

Employee: Any of the Department's employees.

Factual information: Information accessible to the public (examples: available on a website, part of an issued press release, divulged by a departmental representative during a meeting with the industry or partners, providing this group is not told that the information is sensitive or confidential) and not constituting opinions or political orientations.

"Other" information: Any information that the public cannot access, that is sensitive, confidential, complex or for which a political or departmental decision must be made.

Department's authorized representative: An employee such as a program specialist who is authorized to speak on behalf of the Department or who holds the position of Director.

Representative of senior management: Regional Directors General and Assistant Commissioners or at a higher level.

Political representative: A member of Parliament, a senator, a member of a province's or territory's legislative assembly, a municipality's elected official, or their designated representative(s).

2. Processing of political representatives' requests:

2.1 Summary:

The Department is committed to respond to political representatives' requests in a timely manner. Political representatives' questions are answered by the *Department's authorized representatives* or by a *representative of senior management*. Upon receiving a question from a political representative, an employee who is not an authorized representative of the Department must quickly transmit the question to an authorized representative of the Department. Any exchange of information with a political representative must be communicated to the senior management's office (Assistant Commissioner, Regional Director General or higher) the Deputy's Office and to the Minister's Office.

When a political representative's request is of interest to other sectors or regions, these sectors or regions should be consulted. In addition, the Member of Parliament Inquiry Form must be forwarded to these sectors or regions for information purposes.

Attention should be given to providing personal information to an MP, consistent with the Privacy Act, which allows for the disclosure of personal information to an MP for the purpose of assisting the individual to whom the information relates in resolving a problem.



2.2 Obligation of the employee who receives a request for factual or political information or a request for a meeting:

When a political representative contacts an employee, the employee must:

2.2.1 If the request is made by telephone:

The employee must immediately make note of the request. The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

The employee should call the political representative back within 1 working day to communicate the name of the Department's authorized representative, or of senior management's representative if necessary, who will be responsible for responding to the request, if a response could not be given during the call.

2.2.2 If the request is sent via email:

The employee must acknowledge within 1 working day that the request has been received.

If it is possible and does not delay the sending of an acknowledgement message, the acknowledgement message should include the name of the Department's authorized representative, or of the representative of senior management if necessary, and the latter should receive a copy of an acknowledgement message via email.

The employee must transmit the question to an authorized representative of the Department, including a representative of senior management if necessary, no more than four hours after receiving the request.

2.3 Processing requests for factual information:

Summary: Requests for factual information will receive a response within 2 working days from program directors or specialists, meaning the Department's authorized representatives.

Requests for factual information transmitted by an employee or received directly by the authorized representative of the Department must receive a response no more than 2 working days after the Department has received the request.

When the political representative's request requires the provision of factual or "other" information, the authorized representative of the Department can immediately provide the factual information and indicate that the "other" questions (of a sensitive, confidential or political nature) will be answered once the appropriate stakeholders have been consulted.

The authorized representative of the Department must complete the Member of Parliament Inquiry Form and forward it to the office of the appropriate senior management representative (RDG, AC or ADM), sending a copy to the executive assistant, no more than 1 working day after the factual information has been shared with the political representative.

The office of senior management's representative will then forward the form to the Ministerial Liaison Office and to the Deputy Minister's office no more than four (4) hours after it was



received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office.

2.4 Processing requests for "other" information:

Summary: Requests for "other" information (sensitive, complex, requiring the taking of a political position, confidential) will receive a response within 96 hours (four working days) from senior management's representatives (regional directors general and assistant commissioners or at a higher level). Within 2 working days of receiving a request, the Minister's Office will receive, for approval, the questions asked and suggested responses. After receiving approval for suggested responses, the member of senior management will contact the political representative.

Supported by recommendations from program directors and specialists, senior management's representative will submit, within 2 working days, the questions asked by the political representative and proposed response using the MP Inquiry Form to the Deputy Minister's office and the Ministerial Liaison Office. The Ministerial Liaison Office is responsible for forwarding the questions and the response guidelines to the Minister's Office.

The Minister's Office, through the Ministerial Liaison Office or directly, must authorize senior management's representative to transmit responses to the political representative.

Once the Minister's Office has authorized the transmission of responses, senior management's representative must give the information to the political representative within 2 working days.

In general, the political representative's responses can be provided within 96 hours (four working days) of receiving the request.

Within 1 working day, senior management's representative (or their office) will confirm with the Deputy's Office and the Ministerial Liaison Office that the information has been shared with the political representative.



2.5 Request for meetings from political representatives:

Summary: Requests for meetings with political representatives (federal, provincial, municipal) will be accepted (or declined) within 2 working days of the request. Within 1 working day, the Minister's Office will be informed of the request, for comment. Following the meeting, a summary, noting any action items, will be provided to the Minister's Office (via the Ministerial Liaison Office).

When receiving requests for meetings with political representatives, clarify, to the extent possible, details of the meeting (e.g. items to be discussed, timing considerations and participants [e.g. for an event, other participants?]).

Within four hours, notify the RDG, AC or ADM, copying the executive assistant, that a meeting has been requested by a political representative via the Member of Parliament Inquiry Form. Include relevant information (e.g. subject, timing, etc.) and recommendation to meet.

The office of the RDG, AC or ADM will endorse the recommendation (accept or decline) and forward it to the Ministerial Liaison Office, which is responsible for sending it to the Minister's Office, and to the Deputy Minister's Office. If, in the opinion of the Deputy's Office or the Minister's Office, there is an issue, the office of the RDG, AC or ADM will be advised of concerns (typically within one working day).

Within 2 working days of receiving the initial request, the authorized representative will accept or decline the Department's participation. The RDG, AC or ADM will authorize the name of the employee(s) who will participate in the meeting.

Within 1 working day of the meeting, the Department representative who met the political representative will provide a summary of the meeting, including any action items or follow up, to the RDG/AC/ADM office, with a copy to the executive assistant. The office of the RDG/AC/ADM will send the form to the Ministerial Liaison Office and to the Deputy Minister's Office no more than four hours after the form has been received. The Ministerial Liaison Office is responsible for forwarding the form to the Minister's Office (if relevant).

This approach applies for requests from federal, provincial, territorial and municipal elected officials, and their staff, and for senators. Meeting requests from foreign dignitaries are handled by Global Affairs Canada and this directive does not apply to such requests.



**MEMBER OF PARLIAMENT
INQUIRY FORM**

**DEMANDE DE RENSEIGNEMENTS
D'UN MEMBRE DU PARLEMENT**

Date: 17 August 2018

Member of Parliament:
Membre du parlement : Churence Rogers

Riding:
Circonscription : Bonavista – Burin - Trinity

Telephone No:
Nº. de téléphone :

Subject:
Objet : Placentia Bay Atlantic Salmon Aquaculture Project

**INQUIRY/ DEMANDE DE
RENSEIGNEMENTS:**

QUESTIONS:

Barbara Crann, Executive Assistant of Churence Rogers, MP, emailed with an inquiry to Jacqueline Perry, A/Regional Director, Fisheries Management requesting an update on the environmental impact statement review for the Placentia Bay Atlantic Salmon Aquaculture Project.

Response

Over the past number of months, DFO as a member of the Provincial environmental assessment committee, has completed a thorough review of the Environmental Impact Statement (EIS) for the Grieg Aquaculture Project.

On July 12, 2018, DFO provided its initial comments to the Provincial environmental assessment committee. After further discussions with the committee and detailed review by DFO personnel, these were further refined and provided on August 10, 2018. Over the past week, DFO has been continuing discussions with Provincial officials and providing requested clarification regarding DFO's advice to the Environmental Impact Statement (EIS) recommendations for the Grieg Aquaculture Project. We consider now that our comments regarding the Placentia Bay Atlantic Salmon Aquaculture Project are finalized and that many of the issues identified can be addressed through regulatory processes that would take place should the project proceed.

DFO remains of the view that additional information should be provided on the potential ecological impacts (such as through predation or competition) that an escape of a large number of farmed salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic salmon. How the Provincial environmental assessment committee wishes to address DFO comments is a Provincial decision.



Our personnel continue to work with the Province (through the EA committee and directly) to help them respond to or address comments they received on the EIS from other parties.

Employee Name:
Nom de l'employé :

Helen Griffiths

Position:

Poste :

A/Regional Manager – Fisheries Protection Program

Telephone No:

Nº. de téléphone :

(709) 772-4088

Sector or Region/Secteur
ou région

Approved by/Approuvé
par :

Copy forwarded for
information to the
sector/office:
Copie acheminée pour
information au
secteur/bureau :

Bieger, Tilman

From: Bieger, Tilman
Sent: August-17-18 12:41 PM
To: Pike, Kelly J
Subject: FW: Checking in
Attachments: Grieg-MP-inquiryform-August 17 2018.docx

Have a read pls and fwd asap

From: Griffiths, Helen
Sent: August-17-18 11:40 AM
To: Bieger, Tilman
Subject: RE: Checking in

From: Bieger, Tilman
Sent: August-16-18 5:43 PM
To: Griffiths, Helen
Subject: RE: Checking in

Helen I wonder is this request being driven by anything that arose out of the meeting today?

It would be good for us to be able to communicate that we've provided our final advice now, that we consider that all of the issues we raised could be addressed after an EA decision is made, and that the Province is working on ways to do that.

Available to discuss

From: Pike, Kelly J
Sent: August-16-18 4:46 PM
To: Griffiths, Helen
Cc: Johnson, Roger; Bieger, Tilman
Subject: FW: Checking in
Importance: High

Helen,

Please provide input using attached MP inquiry form (note 24 hour required for MP Inquiries)

Also, attached recent submission for reference.

Kelly

From: Butler, Annette
Sent: Thursday, August 16, 2018 4:39 PM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>

Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>
Subject: FW: Checking in

Please see below for your review/action. Please route through the RDGO for approval.

Note the turnaround time for MP Inquiries is 24 hours.

Thank you,
Kim

From: Abbass, Lily
Sent: 2018–August-16 4:25 PM
To: Butler, Annette
Subject: Re: Checking in

Go ahead. They should treat it as an MP enquiry as they did before.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Butler, Annette
Sent: Thursday, August 16, 2018 4:15 PM
To: Abbass, Lily
Subject: FW: Checking in

Shall I task to EM?

K

From: Rogers, Churence - Assistant 1 [<mailto:Churence.Rogers.A1@parl.gc.ca>]
Sent: 2018–August-16 3:31 PM
To: Perry, Jacqueline
Subject: Checking in

Hi Jackie,
Would you have a moment to chat? Churence wanted me to reach out to you as he was hoping for a quick update on Grieg?

Thanks,
Barb

Barbara Crann
Executive Assistant~
MP Churence Rogers
Bonavista-Burin-Trinity



Fisheries and Oceans
Canada

Pêches et Océans
Canada

MEMBER OF PARLIAMENT INQUIRY FORM

DEMANDE DE RENSEIGNEMENTS D'UN MEMBRE DU PARLEMENT

Date: 17 August 2018

Member of Parliament:
Membre du parlement : Churence Rogers

Riding:
Circonscription : Bonavista – Burin - Trinity

Telephone No:
N°. de téléphone :

Subject:
Objet : Placentia Bay Atlantic Salmon Aquaculture Project

INQUIRY/ DEMANDE DE RENSEIGNEMENTS:

QUESTIONS:

Barbara Crann, Executive Assistant of Churence Rogers, MP, emailed with an inquiry to Jacqueline Perry, A/Regional Director, Fisheries Management requesting an update on the environmental impact statement review for the Placentia Bay Atlantic Salmon Aquaculture Project.

Response

Over the past 2 weeks, DFO has been in close discussions with Provincial officials on our input for the Environmental Assessment (EA) for the Grieg Aquaculture Project.

The Department's input, which was based on a scientific review that will be published, included recommendations about describing the effects of potential large-scale fish escapes, and about the procedures for sterilizing the fish to be farmed.

Based on the discussion and responses by the Province these and other issues, we determined that all of the issues we raised can be addressed through regulatory processes that would take place should the project proceed. This is consistent with recommendations about the project the Department made in 2016.

DFO has no further comments on the provincial EA for the project, and is not requesting any additional information in connection with that would impede a decision by the provincial Minister for Municipal Affairs and Environment.

Employee Name:
Nom de l'employé : Helen Griffiths

Position:
Poste : A/Regional Manager – Fisheries Protection Program

Deleted: Over the past number of months, DFO, as a member of the Provincial environmental assessment committee, has completed a thorough review of the Environmental Impact Statement (EIS) for the Placentia Bay Atlantic Salmon (Grieg) Aquaculture Project. ¶

¶ On July 12, 2018, DFO provided its initial comments to the Provincial environmental assessment committee. After further discussions with the committee and detailed review by DFO personnel, initial comments were further refined and provided on August 10, 2018.

Deleted: continuing

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Deleted: regarding

Deleted: DFO's

Deleted: comments

Deleted: on

Deleted: Impact Statement (EIS)

Deleted: We now consider that our comments regarding the Placentia Bay Atlantic Salmon Aquaculture Project are finalized

Deleted: and

Deleted: comments

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Deleted: does not require

Deleted: further

Deleted: order for the provincial Minister of Municipal Affairs and Environment to make a decision on this project. ¶

Deleted: DFO remains of the view that additional information should be provided on the potential ecological impacts (such as through predation or competition) that an escape of a large number of farmed salmon could have on wild populations of commercial and non-commercial fish in Placentia Bay, including Atlantic salmon. How the Provincial environmental assessment committee wishes to address DFO comments is a Provincial decision. ¶



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Telephone No:

N°. de téléphone :

(709) 772-4088

Sector or Region/Secteur
ou région

Approved by/Approuvé
par :

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information au

secteur/bureau :

No information has been removed or severed from this page

Bieger, Tilman

From: Bieger, Tilman
Sent: August-17-18 1:09 PM
To: Griffiths, Helen; Pike, Kelly J
Subject: Re: Checking in

Thanks Helen

I revised /distilled a bit to focus on the message that RDG told me needed to be communicated here.
Kelly could u pls fwd the final version to Helen.

Thx

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen
Sent: Friday, August 17, 2018 11:39 AM
To: Bieger, Tilman
Subject: RE: Checking in

From: Bieger, Tilman
Sent: August-16-18 5:43 PM
To: Griffiths, Helen
Subject: RE: Checking in

Helen I wonder is this request being driven by anything that arose out of the meeting today?

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Available to discuss

From: Pike, Kelly J
Sent: August-16-18 4:46 PM
To: Griffiths, Helen
Cc: Johnson, Roger; Bieger, Tilman
Subject: FW: Checking in
Importance: High

Helen,

Please provide input using attached MP inquiry form (note 24 hour required for MP Inquiries)

Also, attached recent submission for reference.

Kelly

From: Butler, Annette
Sent: Thursday, August 16, 2018 4:39 PM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>
Subject: FW: Checking in

Please see below for your review/action. Please route through the RDGO for approval.

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From: Rogers, Churence - Assistant 1 [<mailto:Churence.Rogers.A1@parl.gc.ca>]
Sent: 2018-August-16 3:31 PM
To: Perry, Jacqueline
Subject: Checking in

Hi Jackie,
Would you have a moment to chat? Churence wanted me to reach out to you as he was hoping for a quick update on Grieg?

Thanks,
Barb

Barbara Crann
Executive Assistant~
MP Churence Rogers
Bonavista-Burin-Trinity

Decker, Shelley

From: Griffiths, Helen
Sent: Friday, August 17, 2018 1:18 PM
To: Decker, Shelley
Subject: FW: Checking in
Attachments: Grieg-MP-inquiryform Churence Rogers-August 17, 2018(v.1).docx

Importance: High

PATH SAPH NO: 16-HNFL-00041

For PATH

From: Pike, Kelly J
Sent: August-17-18 1:08 PM
To: Butler, Annette
Cc: Bieger, Tilman; Griffiths, Helen; Finn, Ray
Subject: FW: Checking in
Importance: High

Kim, as requested see attached MP Inquiry form for RDG sign off and transmittal to DMO/MINO .

Hard copy to follow of same.

Kelly

From: Pike, Kelly J
Sent: Thursday, August 16, 2018 4:46 PM
To: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Cc: Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>; Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Subject: FW: Checking in
Importance: High

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Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>
Subject: FW: Checking in

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Barbara Crann
Executive Assistant~
MP Churence Rogers
Bonavista-Burin-Trinity



**MEMBER OF PARLIAMENT
INQUIRY FORM**

**DEMANDE DE
RENSEIGNEMENTS D'UN
MEMBRE DU PARLEMENT**

Date: 17 August 2018

Member of Parliament:
Membre du parlement : Churence Rogers

Riding:
Circonscription : Bonavista – Burin - Trinity

Telephone No:
N°. de téléphone :

Subject:
Objet : Placentia Bay Atlantic Salmon Aquaculture Project

**INQUIRY/ DEMANDE DE
RENSEIGNEMENTS:**

QUESTIONS:

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The Department's input, which was based on a scientific review that will be published, included recommendations about describing the effects of potential large-scale fish escapes, and about the procedures for sterilizing the fish to be farmed.

Based on the discussion and responses by the Province, we determined that all of the issues we raised can be addressed through regulatory processes that would take place should the project proceed. This is consistent with recommendations about the project the Department made in 2016.

DFO has no further comments on the provincial EA for the project, and is not requesting any additional information in connection with the EA that would impede/delay a decision by the provincial Minister for Municipal Affairs and Environment.

Employee Name:
Nom de l'employé : Helen Griffiths



Position:

A/Regional Manager – Fisheries Protection Program

Poste :

Telephone No:

N°. de téléphone :

(709) 772-4088

Sector or Region/Secteur
ou région

Approved by/Approuvé
par :

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sector/office:
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information au
secteur/bureau :

Bieger, Tilman

From: Bieger, Tilman
Sent: August-17-18 1:42 PM
To: Pike, Kelly J
Subject: Re: RDG Call agenda

Yes pls could u ask him to provide brief summary of engagement I mentioned. Some of that is covered in the info he provided this AM but much less detail needed

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Pike, Kelly J
Sent: Friday, August 17, 2018 1:17 PM
To: Bieger, Tilman
Subject: FW: RDG Call agenda

Tilman, will I have Steve prepare as per Jackie's request?

From: Butler, Annette
Sent: Friday, August 17, 2018 11:47 AM
To: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>
Subject: FW: RDG Call agenda

Note below request for additional information.

From: Perry, Jacqueline
Sent: 2018-August-17 11:46 AM
To: Butler, Annette
Subject: RE: RDG Call agenda

Can I get some more detail on the engagement noted under the MCT item – when and with whom?

From: Butler, Annette
Sent: Friday, August 17, 2018 11:40 AM
To: Perry, Jacqueline <Jacqueline.Perry@dfo-mpo.gc.ca>
Subject: FW: RDG Call agenda

FYI

From: Pike, Kelly J
Sent: 2018-August-17 9:26 AM
To: Butler, Annette
Cc: Bieger, Tilman
Subject: FW: RDG Call agenda

Kim, see Tilman's email below.

If RDG would like any more information, please let me know.

Kelly

From: Bieger, Tilman
Sent: Friday, August 17, 2018 9:21 AM
To: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>
Subject: RE: RDG Call agenda

I would offer these three EM items for round-table

Escape of aquaculture, and whale entanglement in recovery nets: On Tuesday the Department instructed Cold Ocean Salmon to suspend efforts to recover salmon in Hermitage Bay after an escape from a marine grow out cage around July 27, after a humpback whale became entangled in one of the nets. Some 400 of the estimated 2,000 – 3,00 salmon that escaped have been recovered so far. A decision will be made later as to whether recapture efforts should resume (in a manner that does not jeopardise a number of whales that are in the area).

Grieg NL salmon aquaculture project: The Department continues to liaise with the Province of NL and the Grieg NL company on the provincial environmental assessment (ordered by a provincial court) for a large salmon aquaculture project proposed in Placentia Bay. In 2016 federal departments including DFO decided the project did not require a federal EA. The Department participates in the provincial EA committee for the project. We are helping the Province appropriately consider recent/updated DFO Science advice on the project (which could shape the conditions imposed on the project), while keeping our overall advice or position on the project consistent with the previous federal decision that it could proceed to the regulatory phase.

Marine Conservation Targets: We are actively engaging with key stakeholders - notably the fishing industry, the Province of NL, and the Nunatsiavut Government - on identifying areas where Marine Protected Areas could be established in NL in support of the 2020 targets.

From: Pike, Kelly J **On Behalf Of** Finn, Ray
Sent: August-16-18 4:41 PM
To: Tulk, Kirby; Coffin, David; Snow, Stephen; Griffiths, Helen; Johnson, Roger; Sooley, Darrin
Cc: Bieger, Tilman; Finn, Ray
Subject: FW: RDG Call agenda
Importance: High

Please advise if you have any input and/or nil response for the DM/RDG call.

Response due **ASAP**.

Kelly

From: Butler, Annette
Sent: Thursday, August 16, 2018 3:28 PM
To: XNFL-RMC <xnflrmc@DFO-MPO.GC.CA>
Subject: FW: RDG Call agenda
Importance: High

Please advise if you have anything to bring forward.

Due: Friday, August 17, 2018 – 10:00am

Thank you,

Kim

From: Jarjour, Jasmine
Sent: 2018-August-16 3:23 PM
To: Butler, Annette
Subject: RDG Call agenda

Hi Annette,
I've included a draft agenda for the call tomorrow. Any additions?
Jaz

Jasmine Jarjour
Senior Analyst // Analyste principale
Office of the Deputy Minister // Bureau de la Sous-ministre
Fisheries and Oceans Canada // Pêches et océans Canada
@: Jasmine.Jarjour@dfo-mpo.gc.ca

☎: 613-998-3152

BB : 

s.16(2)(c)

Pike, Kelly J

From: Pike, Kelly J
Sent: Friday, August 17, 2018 3:33 PM
To: Daspe, Caroline
Cc: Genier, Sylvie; Butler, Annette; Bieger, Tilman; Finn, Ray; Johnson, Roger; Griffiths, Helen
Subject: FW: Week of August 27th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Attachments: TAB 10 Upcoming Issue and Decisions Week of August 27.pdf; Week of Aug. 27, 2018- AES issues Reports and Consultations Report (Re Escaped Salmon-Greig Updates v.1).docx

Caroline, see attached A/RDG approved input for NL Region.

Kelly

From: Butler, Annette
Sent: Friday, August 17, 2018 3:30 PM
To: Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>
Cc: Dawe, Lana <Lana.Dawe@dfo-mpo.gc.ca>; Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>
Subject: RE: Week of August 27th - AES Issues, Reports and Consultations Report / Upcoming Decisions

See attached input approved by A/RDG-NL Region.

Kim

From: Pike, Kelly J
Sent: 2018-August-17 1:10 PM
To: Butler, Annette
Cc: Bieger, Tilman; Finn, Ray; Johnson, Roger; Griffiths, Helen
Subject: FW: Week of August 27th - AES Issues, Reports and Consultations Report / Upcoming Decisions
Importance: High

Annette,

See attached input for RDG sign off/approval.

Hard copy to follow shortly.

Kelly

From: Daspe, Caroline
Sent: Thursday, August 16, 2018 6:55 PM
To: Butler, Annette <Annette.Butler@dfo-mpo.gc.ca>; Cochrane, Kim <Kim.Cochrane@dfo-mpo.gc.ca>; Hickson, Cindy <Cindy.Hickson@dfo-mpo.gc.ca>; Rossignol, Pauline <Pauline.Rossignol@dfo-mpo.gc.ca>; Wilson, Teresa M <Teresa.Wilson@dfo-mpo.gc.ca>; XCA-Grp, RDGO <XCA-Grp-RDGO@dfo-mpo.gc.ca>; Johal, Sharan <Sharan.Johal@dfo-mpo.gc.ca>; Hébert, Linda M <Linda.Hebert@dfo-mpo.gc.ca>; Pallard, Jessica <Jessica.Pallard@dfo-mpo.gc.ca>; Pike, Kelly J <Kelly.Pike@dfo-mpo.gc.ca>; Couturier-Dubé, Geneviève <Genevieve.Couturier-Dube@dfo-mpo.gc.ca>; Kaba, Kyle <Kyle.Kaba@dfo-mpo.gc.ca>; Landry, Anne <Anne.Landry@dfo-mpo.gc.ca>

Cc: Genier, Sylvie <Sylvie.Genier@dfo-mpo.gc.ca>

Subject: RE: Week of August 27th - AES Issues, Reports and Consultations Report / Upcoming Decisions

Hi all / Bonjour,

**Please note this request is for items pertaining to Aquatic Ecosystems Sector only /
Veuillez noter que cette demande concerne uniquement les articles appartenant au secteur des
écosystèmes aquatiques**

Please update (in the language of your choice) the attached report with a regional perspective and return to me **by
10am on Monday, August 20th (Eastern Time).**

Please note if no response is received by the timeline provided, it will be considered a NIL response.

Please note this request is for the period of August 27th to September 7th.

Veuillez fournir vos données (dans la langue de votre choix), incluant la perspective régionale pour le rapport ci-joint **par 10h00 lundi le 20 août. (heure de l'est).**

S'il vous plaît noter si aucune réponse n'est reçue par le temps fourni, il sera considéré comme une réponse NUL.

SVP noter que cette demande est pour la période du 27 août au 7 septembre

Thank you/Merci.

Caroline Daspe

Document control and administrative officer | Agente contrôle des documents et administration

Aquatic Ecosystems | Secteur des écosystèmes aquatiques

Fisheries and Oceans Canada/Pêches et océans Canada

Tel: 613-990-7110

Caroline.Daspe@dfo-mpo.gc.ca

=====

Guidelines for Issues, Reports & Consultations report / Lignes directrices pour le rapport d'enjeux, de rapports et de consultations:

Issues expected for the next two weeks (from August 27 – September 7, 2018)

Enjeux prévus pour les prochaines deux semaines (à partir du 27 août – 7 septembre)

Anticipated reports, studies, publications, etc. Please identify any reports expected for public release whether they are from DFO or from others but with implications for DFO (to be released before **September 7, 2018**).

Rapports anticipés, études, publications, etc. Veuillez identifier tous les rapports en attente pour publication - même s'il s'agit d'un rapport du MPO ou provenant d'autres organismes avec des implications pour le MPO (date de publication avant le **7 septembre**).

Meetings/consultation planned for August 27 – September 7 2018

Rencontres/consultations prévues pendant la période à partir du 27 août – 7 septembre 2018

Please provide **ONLY** information that the Minister and/or Minister's Office should be made aware of because of the potential for it to attract public or media attention. For issues, please explain why it is an issue, anticipated reaction and plans to manage the reaction. Please ensure your input is signed off by your DMB member.

When you transmit the info, please indicate which issues, reports or consultations should be included in the Week at a Glance - these are the same issues that the Commissioner or SADM will be raising during the Round Table.

Veillez fournir uniquement les renseignements dont le ministre ou le bureau du ministre devraient prendre connaissance parce qu'ils peuvent potentiellement attirer l'attention du public ou des médias. En ce qui concerne les enjeux, veuillez expliquer pourquoi il s'agit d'un enjeu, quelle est la réaction anticipée et quels sont les plans devant servir à gérer cette réaction. Veuillez-vous assurer que votre contribution est signée par votre membre du Conseil du ministère.

Lorsque vous transmettez les renseignements, veuillez indiquer quels enjeux, rapports ou consultations devraient être inclus dans le Coup d'œil sur la semaine – ceux-ci correspondent aux enjeux que le Commissaire ou le Sous-ministre adjoint principal soulèveront durant la table-ronde.

No information has been removed or severed from this page

**TAB 10 - UPCOMING ISSUES AND DECISIONS /
ONGLET 10 - PROCHAINS ENJEUX ET DÉCISIONS**


SECRET


#	ISSUE / PROBLÈME	DESCRIPTION	IMPACT / EFFET	NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
Aquatic Ecosystems Sector / Secteur des écosystèmes aquatiques – August 13th to August 24th / du 13 août au 24 août				
	Escape of aquaculture salmon near Hermitage, NL (UPDATE)	<p>In late July 2018, 2000-3000 Atlantic salmon (3-5 lbs each) escaped from a marine cage operated by Cold Ocean Salmon (subsidiary of Cooke Aquaculture) near Hermitage on the south coast of Newfoundland. This is the first large-scale escape of farmed salmon reported in NL since 2013.</p> <p>The Department directed the company to take measures to recapture the fish. DFO Fishery Officers and Guardians have been overseeing company efforts. DFO Science personnel also recaptured some fish. As of August 14, 400 fish have been recaptured.</p> <p>On August 14, a humpback whale became entangled in one of the nets. DFO directed that netting immediately cease and the whale was freed later that day.</p> <p>Some media coverage has inaccurately depicted a lack of coordination between federal and provincial authorities on this issue. The Region clarified roles in an interview with the CBC Broadcast on August 16.</p>	<p>Opponents to aquaculture are criticizing the industry for this incident and calling into question containment capabilities. They will emphasize the possibility of impacts to wild salmon (including through interbreeding).</p> <p>Media attention on this issue could be relevant to the ongoing provincial environmental assessment of a large new aquaculture project in Placentia Bay proposed by Grieg NL.</p>	<p>The Region is monitoring Hermitage Bay to determine when netting for escaped fish could resume without risk to whales.</p> <p>The Department will work with the Province in the coming months to review the incident, the adequacy of the company's response, and the measures in place to avoid these incidents.</p> <p>Regional personnel will continue working with NHQ to respond to media inquiries.</p>
	Grieg NL Placentia Bay Project Environmental Assessment (UPDATE)	<p>The NL Department of Municipal Affairs and Environment (MAE) is carrying out an environmental assessment (EA) of a large aquaculture project proposed by Grieg NL in Placentia. DFO is participating in the provincial EA Committee along with other federal and provincial authorities. There has been public and media discussion about the project, and stakeholder groups have submitted input critical of the EIS.</p> <p>The Department has provided advice/comments to the EA based on a DFO science advisory process that examined the</p>	<p>Opponents of the aquaculture industry would criticize a decision by the provincial Minister of MAE to release the project from EA, and could question how DFO scientific advice on the project will be addressed.</p>	<p>Draft media lines have been prepared in the event that DFO receives inquiries on this issue.</p> <p>Regional officials will continue to liaise with provincial officials to support their efforts to have the EA decision appropriately incorporate and respond to DFO advice.</p>

**TAB 10 - UPCOMING ISSUES AND DECISIONS /
ONGLET 10 – PROCHAINS ENJEUX ET DÉCISIONS**

SECRET

#	ISSUE / PROBLÈME	DESCRIPTION	IMPACT / EFFET	NEXT STEPS / STATUS PROCHAINES ÉTAPES / SITUATION
		<p>EIS (which is expected to be published in the coming weeks). Advice included recommendations about describing impacts of possible escapes of farmed fish, and the measures to be followed to ensure the fish to be farmed are sterile. The Department has advised the Province that these and other recommendations by DFO can be addressed in the regulatory phase of the project. This is consistent with decisions DFO and ECCC made about this project in 2016.</p> <p>The provincial Minister was scheduled to make a decision about the EA for the project on July 31, but has not yet. The Provincial EA Committee is still seeking clarification on input received.</p>		


 Approved by:
 R. D. Finn, Regional Director
 Ecosystems Management



Griffiths, Helen

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: August-20-18 3:50 PM
To: Griffiths, Helen
Cc: Squires, Susan
Subject: FW: Sterility Guarantee Confirmation
Attachments: GriegNL_Finalsigned_Sterility confirmation Aug 17 2018.pdf

Importance: High

Hi Helen,

FYI...the information provided by the proponent re triploidy is attached.

Joanne Sweeney
Project EAC Chair
Environmental Assessment Division
Tel. (709) 729-2822

From: [REDACTED]
Sent: Friday, August 17, 2018 2:28 PM
To: Squires, Susan <SusanSquires@gov.nl.ca>
Cc: Sweeney, Joanne <joannesweeney@gov.nl.ca>; [REDACTED]
Subject: Sterility Guarantee Confirmation
Importance: High

Susan

As per your Department's request, please find attached confirmation from BenchMark Genetics (SalmoBreed/Stofnfiskur) regarding the 100% sterility of the triploid Atlantic salmon eggs to be used for the Placentia Bay Atlantic salmon project by Grieg NL. The import and use of which have been approved by both DFO and CFIA.

This document provides a definitive statement of the sterility of the salmon eggs which will be delivered to Grieg NL. BenchMark Genetics is the world leader in the aquatic livestock sector. Their staff and contributors are the globally recognized leaders in this field. They are not just experts but do the research, development and several occupy prominent roles as academics within the genetics field.

This letter serves to enhance the authoritative nature of the 100% guarantee provided in the EIS support documentation (Appendix I).



Regards

s.19(1)



Grieg NL

**P.O. Box 457
205 McGettigan Blvd.
Marystown, NL A0E 2M0**

Tel: (709) 279-3440

Cell: [REDACTED]

s.19(1)



www.griegnl.ca

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**Benchmark
Genetics**

August 17th, 2018

**Grieg NL Seafarms Ltd.
P.O. Box 457
205 McGettigan Blvd.
AOE 2M0**

Attn: [REDACTED]

Guarantee of eggs from Stofnfiskur Hf. to Grieg NL Seafarms Ltd. will be sterile

By following our strict procedures on production of triploid eggs we hereby guarantee that the eggs that will be delivered to Grieg NL Seafarms Ltd. will be sterile. These procedures have been clearly detailed in the Environmental Impact Statement your company submitted to the Province of Newfoundland in May 2018 (Appendix I in EIS). This Appendix is attached to this document. Our strict procedures include that we;

- Produce according to same standardised protocols (ISO 9001:2008 certified) each time with experienced personnel using the same equipment each time of triploidisation
- Use of a unique two-tiered approach for testing that allows each batch to be tested twice. To accomplish this a proportion of the eggs are incubated at 8°C so these can be analysed earlier (reaching 350 d°C) than the eggs for shipment incubated at 6°C. Both batches (batch incubated at 8°C and the batch incubated at 6°C) are tested.
- From each incubated female 10 eggs are analysed to determine and issue a triploidisation certificate. All raw data would be available, however, due to IP constraints, more detailed procedures and protocol information than already provided cannot be described.

s.19(1)

Best available copy



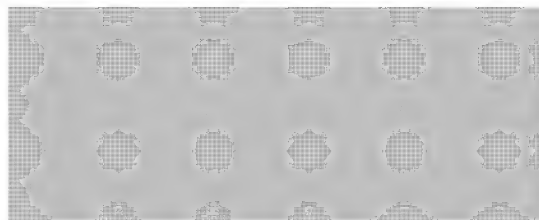
**Benchmark
Genetics**

Stofnfiskur Hf. has a long experience in triploidisation of salmon eggs. The method is well-known and published in the scientific literature. We have optimised our procedure to the highest possible result and can today guarantee 100% sterile eggs from our deliveries of triploids. In addition, Stofnfiskur and its parent company SalmoBreed have an extensive history in salmon egg production and genetics. Together the companies form in Benchmark Genetics a large and unique technical environment within research, breeding and genetics that few other breeding companies in the world can match. This is a strong advantage for the customers that work with us, using this competence to access the latest and most advanced products available in the market. Our support team is comprised of staff that are experts and leaders in their field. Attached is a more detailed description of our companies' history and some of the qualifications of our team.

Kind regards,



Benchmark Genetics Ltd



Benchmark Genetics Ltd

s.19(1)

SalmoBreed & Stofnfiskur History and Team Qualifications

History

Stofnfiskur's production of high quality Atlantic salmon eggs, fry, parr and smolt is built on a unique selective breeding program. The products are developed by world class specialists in genetics, in a disease-free environment not found anywhere else in the salmon farming areas of the world. The history of rearing of Atlantic salmon in Iceland goes back to 1941, when farmers tried hatching and rearing of salmon juveniles.

In 1961 the research station at Kollafjordur was established. The main purpose was to produce salmon fry and smolt for releases into rivers to increase angling catches as well as rearing to market size. In March 1991 Stofnfiskur was founded with the main emphasis on breeding and selection for ocean ranching of Atlantic salmon. In the 1990s there was a growing demand for salmon egg production from farming operations throughout the world. By 1995, four years after the founding, Stofnfiskur was exporting eggs to Chile and Ireland. Stofnfiskur is still the only company in the world with authorization to export Atlantic Salmon Ova to Chile.

In 2014, Stofnfiskur became a part of Benchmark Breeding and Genetics (BBG), a leading international breeding company in developing, producing and selling salmon ova. The Norwegian Company SalmoBreed, Akvaforsk Genetics Center and the American producer of tilapia, Spring Genetics, are also part of BBG.

SalmoBreeds' activities are based on more than 40 years of efforts to produce the best breeding stock. In 1975 the farming company AS Bolaks started collecting genetic material from the best Norwegian salmon rivers. So, did the farming company Jakta Fiskeoppdrett in 1979. These sources have formed the basis for SalmoBreeds present breeding program. In 1985, the Norwegian Fish Farmers breeding center established in Kyrksæterøra, Sor-Trondelag, an organized system for breeding and sale of roe. As a result of the bankruptcy of Fish Farmers Cooperative (FOS), the genetic material was transferred in 1992 to the Norwegian Salmon Breeding (NLA).

In the years up to 1999 NLA was more or less predominant in Norway in the production and delivery of genetic material to the aquaculture industry. There were many roe producers along the coast, and several wanted an alternative company. This led to the foundation of SalmoBreed in 1999.

SalmoBreed AS was officially founded by Bolaks, Osland Havbruk and Akvaforsk Genetics Center (AFGC). For two years Erfjord Stamfisk and Sjøtroll were also part of the owner group. In 1999 the work with family-based breeding gained momentum, based on the well-known stock from Bolaks and thereafter also Jakta from 2002. The family-based breeding program has shown very good results in growth, late maturity and resistance against disease and sea lice.

SalmoBreed has developed a comprehensive database with information from years of calculations and test results. Thanks to systematic and constantly improving knowledge SalmoBreed could in 2010 offer roe which were specific resistant to the viral disease IPN (infectious pancreatic necrosis) and this disease problem disappeared.

SalmoBreed took part in a worldwide collaboration where all salmon genes - around three billion - were mapped. A painstaking work that was completed in 2014. This has made possible to use genomic tools to produce roe that are, among other things, resistant to disease and sea lice.

In 2014 a new ownership structure in SalmoBreed was needed to prepare further growth and capacity in R & D, product development, production, sales and marketing. Work on genetics and breeding has become more advanced. There are increasing demands for finding the right properties. This specialization is very costly, and it was important to get a resourceful owner who could make big investments so SalmoBreed remained a leading company.

The companies Erfjord Stamfisk, Sjøtroll Havbruk, Bolaks, Akvaforsk Genetics Center and Osland Havbruk therefore agreed to sell their shares to Benchmark Breeding & Genetics. The company is owned by Benchmark Holdings is listed in England and delivers a range of products and services to aquaculture industry such as vaccines, veterinary services and feed ingredients.

SalmoBreed Lønningdal is in full operation and is now housing the entire breeding nucleus for SalmoBreed. 350 unique families are in place, and in addition, smolt is produced for new year classes of broodfish. A total of about 300,000 smolt is produced annually, as well as fry directly to customers.

The land-based broodstock site SalmoBreed Salten, owned by SalmoBreed together with Salten Stamfisk, is under construction in Sørfold municipality. With the capacity to produce 150 million ova per year, recycling technology and the highest levels of biosecurity, the plant will be unique in the industry.

SalmoBreed has established the J.V company Salmar Genetics AS together with Salmar. Salmar Genetics produces roe with genetic material from Rauma Stamfisk and SalmoBreed, and the breeding program is run by Akvaforsk Genetics. The value of shared ownership now begins to become visible in Benchmark; Collaboration with BBG's sister companies results in new products and delivery capability throughout the year for SalmoBreed.

Benchmark Genetics is now headed by [REDACTED] who has taken on this role in addition to [REDACTED] of SalmoBreed AS. All the division's Atlantic salmon activities (SalmoBreed AS, StofnFiskur hf and Akvaforsk Genetics Center AS) will now be integrated into one organisation. To support [REDACTED] of StofnFiskur has been appointed Head of Production, responsible for all production sites across the Division. Together the companies form in Benchmark Genetics a large and unique technical environment within research, breeding and genetics that few other breeding companies in the world can match. This is a strong advantage for the customers that work with us, using this competence to access the latest and most advanced products available in the market.

Team Qualifications

CEO STOFNFISKUR AND PRODUCTION DIRECTOR BENCHMARK GENETICS

Senior scientist specialising in selective breeding. A leading scientist in this field with over 30 years of expertise in genetics and fishfarming, the CEO of Stofnfiskur currently holds a PhD. in animal breeding for fish from the Norwegian Agricultural University at Aas and a BSc in Biology.

GENETICS AND GENOMICS MANAGER, SALMOBREED

Involved in breeding and breeding plans as well as development of genetic methods. The Genetics and Genomics Manager currently holds the following: Ph.D in Breeding and Genetics; Masters degree in Breeding and Genetics; Bachelor degree in Animal Science.

HEAD OF FISH HEALTH BENCHMARK GENETICS

Heading the fish health and welfare Benchmark Genetics Ltd (SalmoBreed, StofnFiskur, Spring Genetics, Genetica Spring and Akvaforsk Genetics), the leading aquaculture genetic company. The Head of Fish health currently is a certified Aquamedicine Biologists (M. Sc) and holds a Bachelor's in Economics and Business Administration (BA). An experienced professional with more than 10 years in leading positions within the aquaculture industry.

HEAD OF FUNCTIONAL GENOMICS, STOFNFISKUR

As Head of Functional Genomics, responsible for a myriad of projects such as SNP genotyping, triploid analyses, innate immunity and natural robustness research along with viral and bacterial screenings. With 20 years of experience in molecular biology, the Head of functional genetics for Stofnfiskur also holds a PhD. in Virion- and VAP receptor recognition and a B.Sc. in Molecular Biology and Biotechnology.

RESEARCH MANAGER, HAFNARFJÖRDUR

The Research Manager at Hafnarfjordur has more than twenty years experience working in aquaculture and research and been involved in multiple research projects in aquaculture, both commercial and academic. As head of breeding and genetics, responsible for implementing the most up to date scientific methods in breeding protocols to ensure that stock shows great breeding progress every generation. The Research Manager Currently holds a PhD. in animal breeding; M.Sc. Biology; BSc. Biology and qualified in Quantitative Genetics and Genome Analysis

PROJECT MANAGER GENETICS, STOFNFISKUR

The Project Manager for Genetics at Stofnfiskur has a M.Sc. in Breeding and Genetics and a B.Sc. in Mathematics.

SENIOR SCIENTIFIC ADVISOR, BENCHMARK GENETICS

Since 2000, the Senior Scientific Advisor for Benchmark has worked with genetic research and applied genetics improvement programs in aquaculture. With a wide experience in serving different selective breeding programs within multiple aquaculture species in various countries, the Senior Scientific Advisor has played an active role in organizing and developing selective breeding programs on Atlantic salmon in Norway, which has been crucial for the success of developing efficient and sustainable salmon farming in Norway.

An Adjunct Professor in Aquaculture at Norwegian University of Science and Technology (NTNU) in Trondheim, Norway from 1995 to 2000, the advisor holds a M Sc from the Agricultural University of Norway has authored and co-authored more than 75 scientific publications in aquaculture breeding, ten book chapters and numerous articles in Norwegian and international trade journals.

Available at

https://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1834/1834_eis_docs/main_text_appendices%20a-m.pdf

Appendix I
Stofnfiskur Certification
and
Verification (All-Female, Triploid)

**Pages 1892 to / à 1922
are withheld pursuant to section
sont retenues en vertu de l'article**

68(a)

**of the Access to Information Act
de la Loi sur l'accès à l'information**

White, Terrena

From: Bradbury, Ian R
Sent: August-21-18 9:44 AM
To: Grant, Carole
Subject: Re: Draft Grieg NL EEMP - to discuss at meeting at LGL on 21 August @ 14:30

Will take a break after this session. Will try to take a look. Hopefully in a few hours.

Ian

Dr. Ian Bradbury
Research Scientist , Salmonids Section
Science Branch, Fisheries and Oceans Canada
80 East White Hills Road, P. O. Box 5667
St. John's, NL , Canada, A1C 5X1
Website: Bradburygeneticslab.com
Ph: (709) 772-3869
Email: ian.bradbury@dfo-mpo.gc.ca

On Aug 21, 2018, at 2:00 PM, Grant, Carole <Carole.Grant@dfo-mpo.gc.ca> wrote:

Hey there,

I trust everything is going well. Do you think you'll have a chance to review the attached and get back to me in time for Helen's meeting this afternoon?

Thanks
Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Tuesday, August 21, 2018 8:55 AM
To: Grant, Carole
Subject: FW: Draft Grieg NL EEMP - to discuss at meeting at LGL on 21 August @ 14:30

Hi Carole

Any chance you could have a look at this and provide comments before 130 today? I have a meeting with them at 230. I know [REDACTED] has been in contact with you to get input for this EEMP.

Thanks
Helen

From: [REDACTED]
Sent: August-20-18 4:57 PM
To: Griffiths, Helen; Bieger, Tilman
Cc: [REDACTED] Johnson, Roger
Subject: Draft Grieg NL EEMP - to discuss at meeting at LGL on 21 August @ 14:30

s.19(1)

Hi Helen,

Attached is a draft version of the EEMP associated with Grieg NL's proposed Placentia Bay aquaculture project. The primary reason for providing the draft to DFO is to get feedback and/or direction on the EEMP as it stands at the moment. Obviously it is a document in progress so the 'TBD' designations in the appendix tables are temporary and will be replaced with specific text. Of the monitoring topics given consideration as per the EIS guidelines, '*biological diversity, composition, abundance, distribution, population dynamics, and habitat utilization of fish, marine mammals and seabirds*' represents the biggest challenge, as written. It is quite broad brush in nature so monitoring programs associated with this topic require considerable discussion and thought.

Thanks Helen. We'll see you folks tomorrow at 14:30.

[REDACTED]

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Friday, August 17, 2018 11:25 AM
To: [REDACTED]; Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: [REDACTED]
[REDACTED] Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: Meeting to discuss Grieg NL EEMP

[REDACTED]

That's good for us. Anticipate receiving a draft EEMP on Monday.

Thanks
Helen

From: [REDACTED]
Sent: August-17-18 10:49 AM
To: Griffiths, Helen; Bieger, Tilman
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

Hi Helen,

We're proposing to meet with you on Tuesday, August 21 at the LGL office @ 14:30. How does this sound to you?

Thanks.

s.19(1)

[REDACTED]

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Friday, August 17, 2018 8:51 AM
To: [REDACTED] Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: [REDACTED]
<vmoulton@lgl.ca>
Subject: RE: Meeting to discuss Grieg NL EEMP

[REDACTED]
Can you give me a call before 9:30am?

Helen
772-4088

From: [REDACTED]
Sent: August-17-18 7:53 AM
To: Bieger, Tilman; Griffiths, Helen
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

Hello Tilman and Helen,

As a follow-up to Wednesday's emails, a Tuesday afternoon meeting next week would be preferred, if possible. Is there any chance of confirming that meeting time today?

Thanks.

[REDACTED]
From: [REDACTED]
Sent: Wednesday, August 15, 2018 4:17 PM
To: 'Bieger, Tilman' <Tilman.Bieger@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

Hi Tilman,

That sounds good. We'll wait to hear from Heather to set up a time. Thanks for the quick response Tilman.

John

From: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Sent: Wednesday, August 15, 2018 4:15 PM
To: [REDACTED] Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

[REDACTED]
I am sure that a meeting is possible.

Helen Griffiths (acting as Manager, Fisheries Protection Program – Regulatory Review) is the central contact in our Department for this project at this time – I will ask her to follow up with you and others as appropriate to discuss and arrange a time.

Regards,

s.19(1)

Tilman Bieger
A/RD, Ecosystems Management – NL
Acting Director – Oceans Management / Directeur Intérimaire, Gestion des Océans
Ecosystems Management / Gestion des écosystèmes
Fisheries & Oceans Canada / Pêches et Océans Canada
NL Region / Région de Terre Neuve
Office / Bureau (709) 772-8737
Cell / Tél. cellulaire ()
Fax / Télécopieur (709) 772-7862

From: ()
Sent: August-15-18 1:13 PM
To: Bieger, Tilman
Cc: Candice Way; knut.skeidsvoll@griegnl.com; Val Moulton
Subject: Meeting to discuss Grieg NL EEMP

Good afternoon Tilman,

LGL is currently helping Grieg NL prepare the Environmental Effects Monitoring and Follow-up Plan associated with Grieg NL's proposed Placentia Bay aquaculture project. We are hoping to meet with you and/or relevant DFO personnel next week to discuss the EEMP to date. Is such a meeting possible for either the afternoon of Tuesday August 21 or anytime on Wednesday August 22? It is our intention to provide a copy of the EEMP document to you by end of day Monday August 20. Please advise.

Thanks you.

()
()
LGL Limited
388 Kenmount Road
PO Box 13248, Stn. A
St. John's, NL
A1C 4A5

Office phone: 709-754-1992
Cell phone: ()
Fax: 709-754-7718

s.16(2)(c)

s.19(1)

<Grieg NL EEMP Main Body_20August2018_1651_SB.pdf>

White, Terrena

From: Sweeney, Joanne <joannesweeney@gov.nl.ca>
Sent: June-06-18 10:57 AM
To: Hanchar, Dorothea; Ficzero, Vicki; Angelopoulos, John; Hendry, Christopher; Grant, Carole; Adams, Blair; kawaja, jonathan; Whelan, Dr. Daryl S; Ginn, Melissa (Melissa.Ginn@tc.gc.ca); Pulchan, Jerry [St. John's] (Jerry.Pulchan@EC.GC.CA); Denning, Allison (HC/SC) (allison.denning@canada.ca)
Cc: Squires, Susan
Subject: Itinerary- Grieg NL Site Visit
Attachments: EA Committee itinerary June 12-13.docx

Good Morning:

I've been working with Grieg NL to finalize the itinerary for the EAC site visit on June 12-13, 2018, attached. Currently, 5 EAC members will be making the trip:

Blair
Jonathan
Melissa
Joanne
Dorothea

There's room for more if anyone's schedule has changed. Looks like a busy couple of days!

Joanne
709.729.2822

P.S. When you're booking your room at the Braxton Suites, be sure to reference the block of rooms reserved for the EAC – all other rooms are booked. I'll hold the 3 additional rooms until tomorrow afternoon in case anyone else can make it.

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Environmental Assessment Committee Itinerary

June 12, 2018

- Arrive in Marystown by 12.00 Noon
- 12.00-13.30h Meet at St. Gabriel's Hall (262 Ville Marie Drive, Marystown) for lunch with local Mayors/councillors (Marystown, St. Lawrence, Burin, Parkers Cove)
- Keynote speaker [REDACTED] (Socio-economics of Burin Peninsula)
- 13.30h – 15.00h
 - Site visit RAS Hatchery at Kaetlyn Osmond Drive, Marystown
 - Site visit Marystown OCI wharf
 - Tour of Burin OCI wharf
- 15.00 h - 16.30 h meet at St. Gabriel's Hall, (262 Ville Marie Drive Marystown)
 - discussion DNV-GL (Certification processes)
 - Virtual Reality display Aqualine
- 16.30h – 18.30 h check-in at Braxton
- 18.30 h meet at Marystown Hotel for supper (180-190 Ville Marie Drive)

June 13, 2018

- Check out Braxton/Breakfast on own
- 08.00 h Arrive at Grieg NL office to prepare for Marine site visits (weather dependent). Depart for Midway to park cars (25 min drive)
- 08.30 h Gather for car pooling by Grieg NL to Petite Forte (approximately another 30 minute drive)
- 09.00 h - 09.30h depart Petite Forte for marine site visit (site TBD)
- 09.30 h – 15.30 h marine site visit
- 15.30 h depart Petite Forte for Midway
- 16.00 h Drop off at Midway for committee to pick up cars

Johnson, Roger

From: Griffiths, Helen
Sent: Tuesday, August 21, 2018 12:45 PM
To: Johnson, Roger
Subject: FW:

Just so you have this as well

From: Grant, Carole
Sent: August-21-18 12:07 PM
To: Griffiths, Helen
Subject: Fw:

Helen,

Below are a few comments from Ian, however, he's at a conference in France and only had time to have a quick review of the wild salmon section. I didn't have a chance to review at all.

Hopefully this helps for your meeting this afternoon, however, as we discussed we should communicate that these time lines are unrealistic and obviously we should have an opportunity to circulate to other DFO Science staff for review.

If you have any questions or wish to discuss, feel free to give me a call.

Thanks
Carole

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Ian Bradbury [REDACTED]
Sent: Tuesday, August 21, 2018 11:43 AM
To: Grant, Carole
Subject:

Hi Carole,

I have only had time to review the Atlantic salmon section. My few quick comments are below.

Section 4.5 Wild salmon

First Sentence: The primary potential negative effect on wild salmon associated with finfish aquaculture operations is the potential for transfer of disease and parasites from farm salmon to wild salmon. - This statement is not necessarily true. We have extensively reviewed the genetic and ecological effects previously, but they are not limited to disease and parasites.

Second sentence. Wild salmon would likely have to occur quite close to the sea cages to be infected so minimization of their attraction to sea cages is required. - again this statement is an overstatement. We do not know the distance from cages sites for which infection may occur. Also how could minimization of attraction be accomplished?

s.19(1)

The document states that Grieg NL will work with DFO to establish counting fences in at least two rivers proximate to each active BMA. This would mean six counting fences. This is a significant investment in monitoring of wild salmon populations in the region but will require extensive manpower to install, maintain, and remove these fences. Clarification regarding the DFO assistance required is needed.

Document states: If no escape events occur, then routine monitoring of Atlantic salmon will be ended after a suitable time frame determined through consultation with DFO. The goal of the regular monitoring is not only to monitor for escapees but also to monitor for abundance and health of wild salmon in the BMAs. Therefore a lack of escape events does not seem a suitable justification for ending monitoring.

The document states: If the presence of farmed salmon in the rivers is detected but the farmed fish are not from Grieg NL operations, then the responsibility of routine monitoring should be shifted to the source farm. This assumes the escapees can be assigned to the farms in question. This may or may not be possible. More details are needed here to describe how this will be accomplished. A traceability system (i.e. genetic) for Aquaculture escapees in southern Newfoundland would be a significant step forward however this would require broad industry cooperation and some research and development.

Any questions let me know.

Ian

Johnson, Roger

From: Johnson, Roger
Sent: Wednesday, August 22, 2018 9:19 AM
To: Hendry, Christopher
Subject: FW: Slightly revised Grieg NL EEMP for further distribution within DFO Science
Attachments: Grieg NL EEMP Main Body_21August2018_1620.pdf

As member of the EA committee and the current expert on AAR please have a look at this to see if it dove tails at all with AAR. There is a little more in here than may be in an normal EEM and it may stray into the AAR and other regulatory functions but that was a way of incorporating some of the comments from the EIS review.

I know timeline is short but it is not an extensive document, it has been somewhat retooled based on some brief comments from Ian

Also notice post it note on your monitor – small problem with travel claim – we can discuss

From: Griffiths, Helen
Sent: Wednesday, August 22, 2018 9:12 AM
To: Grant, Carole <Carole.Grant@dfo-mpo.gc.ca>; Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: FW: Slightly revised Grieg NL EEMP for further distribution within DFO Science

Hi
revised version. Would it be possible to get comments from you folks by Monday? This is just a draft, and they realize that, so very likely other opportunities to provide input.
Thanks
Helen

From: [REDACTED]
Sent: August-21-18 4:33 PM
To: Griffiths, Helen
Cc: [REDACTED]
Subject: Slightly revised Grieg NL EEMP for further distribution within DFO Science

Hi Helen,

Thanks again to you and Roger for meeting with us this afternoon. It was a helpful session. Attached is the EEMP with revised text in Section 4.5, based on Ian Bradbury's comments.

[REDACTED]

[REDACTED]

s.19(1)

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Monday, August 20, 2018 5:02 PM
To: [REDACTED]
Subject: Re: Draft Grieg NL EEMP - to discuss at meeting at LGL on 21 August @ 14:30

Thanks [REDACTED]

Sent from my BlackBerry 10 smartphone on the Bell network.

From: [REDACTED]
Sent: Monday, August 20, 2018 4:57 PM
To: Griffiths, Helen; Bieger, Tilman
Cc: [REDACTED] Johnson, Roger
Subject: Draft Grieg NL EEMP - to discuss at meeting at LGL on 21 August @ 14:30

Hi Helen,

Attached is a draft version of the EEMP associated with Grieg NL's proposed Placentia Bay aquaculture project. The primary reason for providing the draft to DFO is to get feedback and/or direction on the EEMP as it stands at the moment. Obviously it is a document in progress so the 'TBD' designations in the appendix tables are temporary and will be replaced with specific text. Of the monitoring topics given consideration as per the EIS guidelines, '*biological diversity, composition, abundance, distribution, population dynamics, and habitat utilization of fish, marine mammals and seabirds*' represents the biggest challenge, as written. It is quite broad brush in nature so monitoring programs associated with this topic require considerable discussion and thought.

Thanks Helen. We'll see you folks tomorrow at 14:30.

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Friday, August 17, 2018 11:25 AM
To: [REDACTED] Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: [REDACTED] Johnson, Roger <Roger.Johnson@dfo-mpo.gc.ca>
Subject: RE: Meeting to discuss Grieg NL EEMP

[REDACTED]
That's good for us. Anticipate receiving a draft EEMP on Monday.

Thanks
Helen

From: [REDACTED]
Sent: August-17-18 10:49 AM
To: Griffiths, Helen; Bieger, Tilman
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

Hi Helen,

We're proposing to meet with you on Tuesday, August 21 at the LGL office @ 14:30. How does this sound to you?

Thanks.

[REDACTED] s.19(1)

From: Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Sent: Friday, August 17, 2018 8:51 AM
To: [REDACTED]; Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

[REDACTED]
Can you give me a call before 9:30am?

Helen
772-4088

From: [REDACTED]
Sent: August-17-18 7:53 AM
To: Bieger, Tilman; Griffiths, Helen
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

Hello Tilman and Helen,

As a follow-up to Wednesday's emails, a Tuesday afternoon meeting next week would be preferred, if possible. Is there any chance of confirming that meeting time today?

Thanks.

[REDACTED]
From: [REDACTED]
Sent: Wednesday, August 15, 2018 4:17 PM
To: 'Bieger, Tilman' <Tilman.Bieger@dfo-mpo.gc.ca>; Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

Hi Tilman,

That sounds good. We'll wait to hear from Heather to set up a time. Thanks for the quick response Tilman.

[REDACTED]
From: Bieger, Tilman <Tilman.Bieger@dfo-mpo.gc.ca>
Sent: Wednesday, August 15, 2018 4:15 PM
To: [REDACTED] Griffiths, Helen <Helen.Griffiths@dfo-mpo.gc.ca>
Cc: [REDACTED]
Subject: RE: Meeting to discuss Grieg NL EEMP

[REDACTED]
I am sure that a meeting is possible.

s.19(1)

Helen Griffiths (acting as Manager, Fisheries Protection Program – Regulatory Review) is the central contact in our Department for this project at this time – I will ask her to follow up with you and others as appropriate to discuss and arrange a time.

Regards,

Tilman Bieger

A/RD, Ecosystems Management – NL

Acting Director – Oceans Management | Directeur Intérimaire, Gestion des Océans

Ecosystems Management | Gestion des écosystèmes

Fisheries & Oceans Canada | Pêches et Océans Canada

NL Region | Région de Terre Neuve

Office | Bureau (709) 772-8737

Cell | Tél. cellulaire ()

Fax | Télécopieur (709) 772-7862

From: ()

Sent: August-15-18 1:13 PM

To: Bieger, Tilman

Cc: ()

Subject: Meeting to discuss Grieg NL EEMP

Good afternoon Tilman,

LGL is currently helping Grieg NL prepare the Environmental Effects Monitoring and Follow-up Plan associated with Grieg NL's proposed Placentia Bay aquaculture project. We are hoping to meet with you and/or relevant DFO personnel next week to discuss the EEMP to date. Is such a meeting possible for either the afternoon of Tuesday August 21 or anytime on Wednesday August 22? It is our intention to provide a copy of the EEMP document to you by end of day Monday August 20. Please advise.

Thanks you.



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s.16(2)(c)

s.19(1)

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**PLACENTIA BAY ATLANTIC SALMON AQUACULTURE PROJECT
ENVIRONMENTAL EFFECTS MONITORING AND FOLLOW-UP PLAN (EEMP)**



GRIEG NL

08/20/2018

DRAFT—Not for Distribution

Environmental Effects Monitoring and Follow-up Plan
Placentia Bay Atlantic Salmon Aquaculture Project Environmental
Management Program

[DRAFT—NOT FOR DISTRIBUTION]

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2			
3			

August 2018
LGL Project No. FA0159

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DRAFT

Table of Contents

	Page
List of Figures	IV
List of Tables	IV
Acronyms and Abbreviations	V
1.0 Introduction	1
1.1 Objectives	1
1.2 Approach	2
1.3 Update of EEMP	5
1.4 Communication Plan	6
2.0 Program Selection	6
2.1 Environmental Assessment	6
2.2 Regulatory Processes	10
3.0 Proposed Land-based Monitoring Programs	12
3.1 Construction Monitoring	12
3.1.1 Sediment Control	12
3.1.2 Breeding Birds	13
3.1.3 Blasting	13
3.2 Operations Monitoring	13
3.2.1 Water Quality	13
3.2.2 Fish Health	14
3.2.3 Accidental/Unplanned Events	15
3.3 Decommissioning	15
4.0 Marine-based Monitoring Programs (Construction and Operations)	16
4.1 Metocean	16
4.1.1 Water Column	16
4.1.2 Climate and Meteorology	16
4.1.3 Ice	16
4.2 Sea Cage Performance	16
4.3 Benthic Habitat	17
4.4 Marine Ecosystem	18
4.5 Wild Salmon	18
4.6 Bird Entanglement	19
4.7 Marine Mammals and Sea Turtles	19
4.8 Species at Risk	19
4.9 Seawater Quality	20
4.10 At-sea Fish Health	20
4.11 Accidental/Unplanned Events	21
4.11.1 Escape	21
4.11.2 Spill	21
4.11.3 Therapeutants and Antibiotics	22
4.12 Decommissioning	22
4.13 Cumulative Effects	22

Table of Contents

5.0	Socio-economic Issues	22
5.1	Training	23
5.2	Equity and Local Benefits.....	23
5.3	Resource Users.....	24
6.0	Program Implementation.....	24
Appendix A – Guide to Descriptive Tables		A-1
Appendix B – Monitoring Program Descriptions.....		B-1

List of Figures

	Page
Figure 1. Follow-up Threshold Exceedance Procedure.....	4

List of Tables

	Page
Table 1. List of Grieg NL Monitoring Commitments.....	7
Table 2. Summary of Candidate Environmental Effects Monitoring and Follow-up Programs. ...	11
Table 3. EEMP Master Schedule (tentative).	25
Table 4. EEMP Monthly Schedule (tentative).....	26

Acronyms and Abbreviations

AAR	Aquaculture Activities Regulations
ADCP	Acoustic Doppler Current Profiler
BMA	Bay Management Area
CCTV	Closed-circuit Television
CFIA	Canadian Food Inspection Agency
COC	Code of Containment
DFLR	Department of Fisheries and Land Resources
DFO	Fisheries and Oceans Canada
DMAE	Department of Municipal Affairs and Environment
ECCC-CWS	Environment and Climate Change Canada-Canadian Wildlife Service
eDNA	Environmental Deoxyribonucleic Acid
EEM	Environmental Effects Monitoring
EEMP	Environmental Effects Monitoring and Follow-up Program
EH&S	Environment, Health and Safety
EIS	Environmental Impact Statement
EWI	Early Warning Indicators
MCTS	Marine Communications and Traffic Services
NOC	National Occupational Classification
OPC	Opportunistic Polychaete Complexes
QA/QC	Quality Assurance/Quality Control
RAS	Recirculating Aquaculture System
ROV	Remotely Operated Vehicle
SAR	Species at Risk
VEC	Valued Environmental Component
ZOI	Zone of Influence

1.0 Introduction

As part of the environmental assessment process for the proposed Placentia Bay Atlantic Salmon Aquaculture Project, Grieg NL is required to prepare and submit an Environmental Effects Monitoring and Follow-up Program (EEMP) subsequent to the completion of the Environmental Impact Statement (EIS) but prior to initiation of Project construction (see Section 7.4 in EIS Guidelines, Department of Municipal Affairs and Environment [DMAE] 2018).

Grieg NL is committed to implementation of an EEMP as a critical component of its Placentia Bay Atlantic Salmon Aquaculture Project. This EEMP is one component of the Grieg NL Environmental Management Program described in the EIS¹. The Grieg NL approach to environmental management is to seek continuous improvement in performance through adaptive management. Grieg NL will evaluate performance and either adjust mitigation measures or apply new ones if deemed necessary. The follow-up monitoring will be amended or supplemented as warranted.

The EEMP describes the process for evaluation and selection of candidate monitoring programs. For each monitoring program, the EEMP will describe the objectives, sampling and analytical methodology, and the criteria for adaptive management. Note that each individual monitoring effort will be modified and adapted through detailed planning and consultation with regulators, partners and other stakeholders.

This document provides a logical process for evaluation and selection of appropriate monitoring programs. Therefore, any candidate program, whether identified by an outside agency or from within Grieg NL, is described in a consistent manner and evaluated for relevance and applicability. By applying established criteria ahead of time, an impartial and objective evaluation is achieved.

1.1 Objectives

The EIS Guidelines require environmental and socio-economic monitoring and follow-up programs for construction, operation and maintenance activities that comprise the Project.

Monitoring as follow-up to environmental impact assessment is a common requirement of regulators and resource managers. In many cases, regulations specify monitoring and reporting programs as a condition of compliance with applicable permits and other authorizations. Additionally, the environmental assessment process serves to identify project-specific requirements for environmental effects monitoring (EEM).

The specific purposes for conducting an environmental effects monitoring program include:

1. To assist in the identification of target species and linkages for monitoring;
2. To provide baseline data that aids in the scheduling/planning of project activities in order to avoid or reduce effects;
3. To evaluate the effectiveness of mitigation measures and verify effects predictions;

¹ Grieg NL has also prepared an Environmental Protection Plan (EPP), which is a stand-alone document, describing the responsible Project staff and environmental protection procedures for activities associated with specific Project phases, including construction, operation and maintenance.

4. To identify unforeseen environmental effects;
5. To provide an early warning of undesirable change in the environment; and
6. To improve the understanding of cause-and-effect relationships.

A robust EEM design addresses public concerns, regulatory requirements, and scientific issues. The goals and objectives of each specific monitoring program need to be clearly stated to ensure the results are scientifically defensible and relevant. Most importantly, the role of the various monitoring programs as early warning indicators will help to identify exceedances or unanticipated effects, thereby triggering corrective action (e.g., additional monitoring; implementation of additional mitigation measures).

1.2 Approach

Grieg NL's approach to the design of the EEMP is to draw on the understanding of ecological interconnections and pathways to develop individual monitoring studies. The result is a pattern of individual monitoring programs, each of which satisfies the selection criteria and the design requirements for EEM. Together, the individual monitoring programs provide a comprehensive monitoring network. Through examination of the measured quantitative changes in the selected indicators, conclusions will be drawn with respect to effects on the ecosystem as a whole.

During development of the EEMP, Grieg NL has sought to ensure that all relevant issues have been addressed while avoiding the tendency to carry out a broad spectrum of poorly focused efforts. In order to accomplish this, emphasis has been focused on the issue of Project-induced change and addressing the challenge of establishing cause-and-effect relationships between the Project and the identified monitoring targets.

Monitoring which simply records change is not EEM. Environmental Effects Monitoring must be relevant to the Project and to the possible Project activity effects on the environment, as well as capable of establishing a relationship between any observed change in the environment and some feature of the Project.

The set of criteria to be applied in considering candidate monitoring studies include:

- A credible *cause and effect* relationship can be postulated/established;
- The identified *effect* has the potential to be *negative*, and *significant* with *moderate to high likelihood* of occurrence;
- The *timing of interaction* between the Project and the Valued Environmental Component (VEC) will be sustained;
- A credible, unplanned event which could result in a *significant negative effect*;
- The level of confidence associated with the predicted *effect* is *low*; and
- The *efficacy of mitigation measures* is uncertain or unproven.

There are three relevant categories of study for EEMP:

1. **Research** – background studies intended to establish need for, or parameters of, an EEMP. Research studies could address issues such as natural variability of a measured parameter or monitoring target, or examine the nature, extent or duration of a potential Project – VEC interaction. Research studies address Purpose 1 for EEMP (see Section 1.1).
2. **Surveillance** – programs to produce information about the pattern of occurrence of target species/monitoring targets. For example, studies to establish travel patterns of migratory animals through the Project area would address Purpose 2 for EEMP (see Section 1.1).
3. **EEM** – programs to address and quantify cause and effect linkages between Project activities and components of the receiving environment. The full rigor of design criteria would apply to this type of monitoring program which would address one or more of Purposes 3–6 for EEMP (see Section 1.1).

Research monitoring is conducted primarily to determine the need for further monitoring. If a program is deemed necessary, research monitoring is conducted to identify target species and linkages. This type of monitoring is typically conducted once at the beginning of a Project. If the determination is that an EEMP is necessary, then either a surveillance program or an EEM program is initiated.

A surveillance program is typically short-term and designed to identify potential mitigation measures intended to minimize effects of interactions between Project activities and VECs. A surveillance program can also serve to identify a change in conditions which could trigger an EEM. A full scale EEM program is typically long-term and multifaceted.

In EEM, it is necessary to establish protocols for data evaluation to determine if there is a need to modify monitoring plans or develop and implement corrective action as per the procedure illustrated in Figure 1. Thus, thresholds will need to be established for each monitoring program in one of a number of possible ways:

- Exceedance of background or baseline data by a prescribed percentage;
- Exceedance of an established “no observable effects concentration”;
- Exceedance of “meaningful change” threshold criteria;
- Exceedance by an amount which is “statistically significant”; and
- Observance of levels which are known to cause an environmental effect.

For each EEM program, appropriate thresholds are established for the parameters and environmental effects being monitored. When thresholds are exceeded, the appropriate staff and management within Grieg NL will be notified, and the appropriate regulatory agencies will also be notified and consulted. The cause of the exceedance and its nature will be investigated. An action plan will be developed, and appropriate mitigation measures will be implemented. As per Grieg NL’s Environmental Management Plan requirement, the EEM program will be reviewed and, if necessary, modified to ensure that it continues to be appropriate.

As indicated in Figure 1, the process for response to an identified effect includes a feedback loop to evaluate each program and achieve “continuous Improvement” in EEM design and implementation. By proper selection of monitoring parameters, these can serve as “Early Warning Indicators” (EWI) of change. Such indicators occur at the start of the pathway between a Project activity and a receptor or VEC.

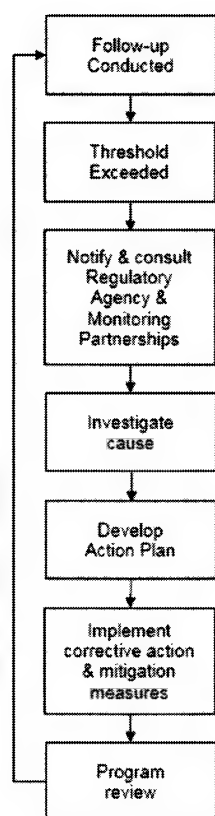


Figure 1. Follow-up Threshold Exceedance Procedure.

Surveillance level studies can also serve as EWIs where an observed change in conditions could trigger a more complete EEM study. Results from EEM studies could also serve to initiate other monitoring. An EEM program focused at one ecosystem level (e.g., benthic invertebrates) could produce evidence of change, which triggers further monitoring at other ecosystem levels (e.g., in fish populations). In some cases, relatively short-term research programs are conducted as a means to provide an EWI. Based on the results of such preliminary studies, a full scale, properly designed EEM program may be initiated.

As noted earlier, program review can be triggered by an exceedance of an EWI. In addition, an annual review will be conducted to assess the relevance of each program in light of project activities, emerging developments in EEM methods, and changes in issues or concerns as identified by Grieg NL, its partners and stakeholders.

The general approach to implementation will be to use Grieg NL Site Environment, Health and Safety (EH&S) staff to conduct the necessary field surveys and sampling. On occasion, consultants may be retained to carry out specialist activities.

The design structure for the respective EEM programs will include:

- Project interaction
 - Phenomena of concern
 - Environmental effect / issue
- Hypothesis formation
- Monitoring target
- Design type (radial gradient, before-after comparison, control-exposure)
- Parameters and endpoints
- Testable hypothesis
- Sample size requirements
- Sampling
 - Frequency
 - Location
 - Timing
- Data collection methods
- Quality Assurance/Quality Control (QA/QC) sampling and requirements
- Sample handling and analysis
- Data interpretation and reporting
- Triggering levels (thresholds)

Appendices A and B in this document present and describe each specific EEM activity. Detailed descriptions are provided for each EEM activity, including monitoring category, study design type, measurable parameters, thresholds and other program-specific information as listed above.

1.3 Update of EEMP

The EEMP is a “living document.” It will be regularly updated based on the process shown in Figure 1, management reviews (will occur annually as a minimum), incident investigations, regulatory changes, or other Project-related changes. As each monitoring initiative is developed, greater detail will be available and included in regular updates of the EEMP. Results of each monitoring initiative will be reported separately but documented and maintained within the Grieg NL Environmental Management Program structure. Some of the monitoring programs will have defined temporal end points that are dependent on observations made during monitoring.

1.4 Communication Plan

Grieg NL will report annually to regulators on the results of ongoing monitoring programs. As well, monitoring reports will be made available online to the interested public. Recipients of the annual monitoring program reports will include regulatory agencies such as DFLR, DFO, and ECCC.

2.0 Program Selection

This section provides a review of requirements and commitments made in the EIS and presents an organized grouping of monitoring and follow-up programs. Program selection criteria consider the effects predictions from the EIS process, and conformance with regulatory processes (permit and authorization conditions).

2.1 Environmental Assessment

Candidate EEM programs identified as an output of the EIS effects prediction process are selected based on the criteria listed in Section 1.2. The EIS provides a conclusion on each of the assessed interactions and predicts the residual effects of each to be either “Significant Negative”, “Not Significant Negative” or “Positive” based on ratings of biophysical criteria. The assessment concluded that all but one of the assessed interactions had residual negative effects predicted to be “Not Significant”. The one exception had a predicted residual effect (socio-economic) of “Positive”. The level of confidence was rated as either medium or high in all cases. No prediction had a low level of confidence. Therefore, the EIS effects assessment did not produce any automatic candidates for EEM programs. Similarly, all effects associated with the socio-economic VECs were predicted to be positive with a high level of confidence.

Within the EIS, Grieg NL committed to an extensive program of monitoring activities as listed in the Executive Summary. This list included a broad range of types of monitoring as can be seen in Table 1, which has been modified for organizational purposes.

The EIS Guidelines (Section 7.4 in DMAE 2018) require that consideration be given to development of monitoring plans related to the following topics.

- a) *performance of the Aqualine Midgard sea cages in the waters of Placentia Bay;*
- b) *direct and indirect genetic and ecological interactions between escaped farmed salmon and wild Atlantic salmon;*
- c) *direct and indirect genetic and ecological interactions between escaped farmed lumpfish and wild lumpfish;*
- d) *performance of European-strain triploids in sea cages in Placentia Bay including growth, survival, health, fitness, and pathogen susceptibility;*
- e) *biological diversity, composition, abundance, distribution, population dynamics, and habitat utilization of fish, marine mammals and seabirds;*
- f) *a benthic monitoring program including a description of sampling locations, frequency, parameters, and regulatory thresholds; and a response plan if regulatory thresholds are exceeded, consistent with the baseline and operational monitoring requirements of the provincial aquaculture licensing process, as prescribed by the Aquaculture Activities Regulations and associated Aquaculture Monitoring Standard;*

- g) a groundwater-monitoring program to monitor water levels and water quality of the hatchery production well and select monitoring wells, to be developed in consultation with the Water Resources Management Division of the Department of Municipal Affairs and Environment; and
- h) climate and meteorological data in the study area, including monthly and annual minimum, maximum and mean values for precipitation, temperature and wind speed, prevailing wind direction, ice dynamics and storm events.

Table 1. List of Grieg NL Monitoring Commitments.

EIS Monitoring Commitments	
RAS Hatchery (land-based)	Project Phase
Erosion and Sedimentation Control	
Sediment control structures will be monitored, maintained, and repaired on a scheduled basis (minimum weekly) and before/after rainfall events >10 mm.	Construction
Breeding Bird Surveys	
If future site clearance activities are required during the breeding bird period, the area will be monitored/visually inspected by construction personnel. If any evidence is detected, clearing will be delayed, and a bird biologist will be consulted.	Construction
Blasting	
The site will be surveyed for animals, such as moose or black bear, prior to any blasting. Blasting will be delayed until the animals leave the site.	Construction
Fish Health – Water Quality	
Water Quality will be monitored and maintained at optimal conditions for growth during first-feeding, smoltification, and post-smolt production.	Operations
A routine program will be established for monitoring, measuring, and recording water quality in all buildings of the RAS Hatchery.	Operations
Fish Health – Mortality Removal	
Fish mortalities as well as moribund fish will be visually assessed and collected at a minimum, daily, via a centralized collecting system. Mortalities will be immediately transported to a centralized ensilage tank. Records kept of all mortalities and their handling/disposal.	Operations
Fish Health – Health Checks and Procedures	
Salmon at each stage of development will undergo health checks and procedures to minimize health risks such as disease.	Operations
Prior to being shipped to Newfoundland, eyed eggs will be tested and certified as disease-free.	Operations
Records of time, source, and location of eggs will be maintained.	Operations
During incubation, eggs will be monitored, and nonviable eggs promptly removed to eliminate fungal growth.	Operations
A private veterinarian will be used to respond to signs of health issues and to conduct routine monitoring prior to each transfer of fish to a new facility.	Operations
Staff and management will work closely with a private veterinarian to communicate any indication of health or disease concerns.	Operations
Staff will be trained to be familiar with normal fish appearance and behaviour and will be aware of the importance of relating any changes observed to supervisors or management.	Operations
A Fish Health Management plan will be implemented to ensure fish health is optimized within all facilities.	Operations
Records will be maintained for each transfer including date, time, number, and weight of fish.	Operations
All handled fish will be closely monitored for a period post-handling.	Operations
Fish Escapes	
During fish transfers between tanks and facilities, fish will be carefully monitored and counted.	Operations
A reinforced, continuous hose extending ~50 m from the shoreline to the well boat will be used to transfer fish. It will sit at the water's surface and will be continuously monitored by personnel.	Operations
Fish will be counted by fish counter as well as being monitored via video as they exit the hatchery and as they enter the well boat.	Operations
The day prior to transport, all equipment to be used will be checked and prepared (including checking the pipe and hose for breaches) and a checklist will be followed on the day of transfer.	Operations
Site Security	
A closed-circuit television system will be installed around (and inside) the RAS Hatchery covering many of the vulnerable areas, public access points and adjacent streets. The system will be monitored by security from a Security Control Room.	Operations
Perimeter breach, intruder and panic alarms will be installed and continuously monitored from the Security Control Room and security will respond immediately to these alarms.	Operations
Members of the Security Team will carry out routine patrols of the buildings to provide a visible deterrence to criminal activity.	Operations
Emergency Response/Contingency Plan	
An Emergency Response Plan will detail procedures required in response to accidents, malfunctions, and emergencies.	Unplanned Events

EIS Monitoring Commitments	
Decommissioning and Rehabilitation	
A plan will be developed with input from regulatory agencies that outlines procedures for shutting down operations at the RAS Hatchery. The plan will clearly lay out the approach and mitigation and monitoring details regarding removal of all fish and fish products, waste, chemicals, equipment and infrastructure.	Closure and Decommissioning
Socio-Economic VECs (Follow-up Monitoring)	
Monitor efforts and success regarding diversity in hiring and retention by major contractors.	All Phases
Environmental Protection	
If follow-up monitoring identifies unforeseen negative effects, an adaptive management approach will be implemented to address issues.	All Phases
Sea Cage Sites (marine-based)	Project Phase
Towing Activities	
Towing activities will be clearly communicated to stakeholders in the area and through Notice to Mariners.	Construction
Fish Escape Prevention – Handling Practices	
Will adhere to the best practices included in Appendix 6 of the COC including those for grading, weight sampling, sea lice counts, transportation, well boat treatments, and harvesting.	Operations
Fish Escape Prevention – Inspections	
As a minimum, nets will be visually inspected every 90 days by an ROV.	Operations
Surface components of mooring systems, cages, nets and ropes on each site will be inspected once per week and recorded.	Operations
Underwater components of the mooring system, including the anchors, will be inspected based on a schedule developed in consultation with Aqualine and approved by DFO or DFLR.	Operations
Periodically, audits of the cage system as specified in COC Procedures for Compliance will be conducted; DFLR will arrange for audits of net testing procedures. Audits by DFLR will be conducted at a minimum of twice yearly (one in the spring, after fish entry, one audit in fall/early winter).	Operations
Ice Monitoring and Mitigation	
All sea cages will be routinely monitored for ice accretion by personnel on-site or via video camera.	Operations
Ice accretion will be minimized by personnel removing ice as it accumulates, which is typically done with rubber mallets.	Operations
Will routinely (minimum daily) receive and monitor broadcasts on ice conditions from the MCTS and receive guidance on the predicted timing and extent of any pack ice (or iceberg) incursions.	Operations
Predator Protection and Control	
Will follow established procedures to release any tangled birds.	Operations
Each cage will have one or two cameras that offer 360 degree viewing and can be raised and lowered within the water column.	Operations
Fish behaviour will be monitored from the control center for indications that a predator may be nearby.	Operations
Fish Health	
Mitigation measures and regular monitoring will be in place to maintain fish health including biosecurity measures, routine husbandry practices, health checks and procedures, use of specialized feed and feeding procedures, sea lice control procedures, water quality monitoring, vaccinations, and removal and treatment of dead fish.	Operations
Health Checks and Procedures – Routine parasite screening will be carried out as well as routine diagnostic testing.	Operations
All routine parasite screening and active surveillance will be conducted by Grieg NL personnel on a schedule determined in consultation with provincial authorities and a private veterinarian that also considers fish health and welfare.	Operations
A passive surveillance program along with diagnostic testing will also be performed by provincial veterinarians.	Operations
Feed wastage will be minimized via the use of established feeding tables/software used to determine feed type and amount and an automatic feeding system with video monitoring.	Operations
Salmon will be monitored during feeding and feed delivery will cease once they have reached ~80% satiation.	Operations
Sea Lice Control – Sea lice levels on salmon will be monitored weekly when water temperatures are above 4 °C and weather conditions allow.	Operations
If monitoring indicates an increase in sea lice levels, Grieg NL will seek guidance from private and provincial veterinarians.	Operations
Water Quality Monitoring – A routine program will be established for monitoring, measuring, and recording water quality at all active sea cage sites on a daily basis throughout the Project.	Operations
In-situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage to record data related to water temperature, salinity and oxygen levels, at a minimum.	Operations
Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for real-time viewing or logged for historical collections.	Operations
Plankton samples will be completed weekly, analyzed and levels recorded.	Operations
Data collection will be used to evaluate the severity of any environmental issues such as fouling or changes in physio chemical data, leading to a response.	Operations
During transport of smolt from the RAS Hatchery to the sea cage sites, water quality in the hold of the well boat will be monitored.	Operations
The number of fish mortalities will be recorded daily.	Operations
If required to handle mortalities (i.e., during sampling procedures), personnel will be required to wear protective clothing, gloves and boots which will be disinfected after each mortality disposal.	Operations

2.0 Program Selection

EIS Monitoring Commitments	
Fish Health – Mortality Removal	
Fish mortalities as well as moribund fish will be visually assessed and collected at a minimum, daily, via a centralized collecting system. Mortalities will be immediately transported to a centralized ensilage tank. Records kept of all mortalities and their handling/disposal.	Operations
Fish Health – Health Checks and Procedures	
Salmon at each stage of development will undergo health checks and procedures to minimize health risks such as disease.	Operations
Marine Habitat	
The Monitoring Protocol for Hard Bottom Benthic Substrates under Marine Finfish Farms in Newfoundland and Labrador will be followed.	Operations
Feed wastage will be minimized using a monitored feed system.	Operations
Cleaning schedule for cages and nets will be developed based on environmental conditions in Placentia Bay as well as routine monitoring.	Operations
Nets will typically be cleaned weekly and cages will be cleaned once or twice during heavy fouling periods.	Operations
Routine checks of equipment utilizing underwater cameras, ROVs, and inspections by divers will be used to confirm the cleaning schedule of the sea cages.	Operations
Entanglement	
Sea cage mooring and buoy lines will be kept tensioned and no loose ropes in water.	Operations
Any entanglement of marine mammals, otters, wild fish, and sea turtles will be reported to DFO and action will be taken, in consultation with DFO (and the Whale Release and Strandings Group), to free or remove the animal.	Operations
Interactions with Other Users	
Will use several techniques to ensure other users of Placentia Bay are aware of the sea cage operations and to minimize the potential for interactions with users of the area.	Operations
Each sea cage site will be clearly marked according to regulatory requirements.	Operations
Sea cage sites will be delineated with a series of highly visible marker buoys, radar reflectors, and strobe lights.	Operations
Will have established transit routes with vessel speed limits (10 knots or 18.5 km/h) from crew change sites, resupply sites, and the RAS Hatchery to each of the sea cage sites.	Operations
Site Security	
A CCTV system will be installed around the sea cages and will be monitored primarily by personnel on the feed/accommodation barge and in the Security Control Room at the RAS Hatchery.	Operations
Species at Risk	
Sightings of any species considered at risk observed at the sea cage sites and during transit to the sea cage sites will be recorded.	Operations
Personnel will receive training from experienced biologist(s) on the identification of the various bird, marine mammal, shark/tuna, and sea turtles and the associated data recording procedures.	Operations
Data will be submitted to DFO and ECCC-CWS as appropriate.	Operations
Vessel crew will maintain watch for marine mammals/sea turtles and alter course and speed as appropriate to avoid marine mammals and sea turtles.	Operations
Follow-up Monitoring (Biophysical VECs)	
Water Quality Monitoring - Multi-year environmental monitoring program using ADCP and multiple probes at the semi-annual BMAs.	Operations
If therapeutants or antibiotics are used, sediment samples will be collected where possible for analysis of presence of chemicals.	Contingency
If an accidental escape occurs, sampling of salmon from rivers, in collaboration with DFO, to determine fish origin (Grieg NL farm or not).	Contingency
Emergency Response/Contingency Plan	
An Emergency Response Plan will detail procedures required in response to accidents, malfunctions, and emergencies.	Unplanned Events
Fish Escape Prevention – Equipment	
ROVs will be used to assist in tasks such as net inspections and in-situ net repair, if required.	Unplanned Events
Socio-Economic VECs (Follow-up Monitoring)	
Monitor efforts and success regarding diversity in hiring and retention by major contractors.	All Phases
Environmental Protection	
If follow-up monitoring identifies unforeseen negative effects, an adaptive management approach will be implemented to address issues.	All Phases

The Guidelines' listing of anticipated monitoring subjects has been considered as discussed below.

Item a) above (sea cage performance) would be part of the program of operational monitoring to ensure the adequate performance of the Aqualine system, as evaluated in the Component Study (Aqualine Midgard Sea-cage Study) associated with the EIS.

Items b) and c) call for an evaluation of the interactions between caged fish (Atlantic salmon and lumpfish) and wild species. These studies fall into the contingency category and, while monitoring plans will need to be developed and reviewed for adequacy, these would be implemented only in the case of an escape incident. However, there would likely be a need for the collection of some related background information in the event of an escape. Background genetic data related to wild salmon have been collected by DFO, while Grieg NL will provide the background genetic data related to the farm fish.

Item d) (triploid performance) actually addresses a core interest of the proponent (i.e., the successful culture of triploid stock in sea cages located in Placentia Bay). Grieg NL will carefully measure and monitor performance of the caged fish.

Item e) is an extensive listing of topics; biological diversity, composition, abundance, distribution, population dynamics and habitat utilization of fish, marine mammals and seabirds. It is challenging to conceive of a single study that could capture all these factors, and even more challenging to define environmental effects monitoring programs that could target each of the project-environment interactions. Any address of this suggested monitoring plan topic will require extensive consultation and discussion with the regulator, other resource management agencies and research organizations, especially in order to render the required scope of work achievable and relevant to the interactions between the Project and the natural environment.

Item f) (benthic monitoring program) is equivalent to the regulatory requirement for sea cage aquaculture operations in Newfoundland and Labrador. Grieg NL will comply with the regulatory guidelines specified by DFO and/or DFLR.

Item g) (groundwater monitoring) can be integrated into the broader monitoring of water quality associated with the Recirculating Aquaculture System (RAS) Hatchery. Grieg NL will work closely with DMAE to develop and implement a monitoring program.

Item h) (climate and meteorology) addresses ongoing monitoring that would logically and easily be integrated into marine operations. Monitoring by Grieg NL at the marine sites (ADCP, data loggers, software for feed barge) in collaboration with third party providers of such data (e.g., Wood, Atlantic Alliance, Canadian Coast Guard) will be utilized.

2.2 Regulatory Processes

Through their permitting processes, regulatory authorities often require the collection of data to confirm conformance with established standards. Such programs are usually referred to as 'compliance monitoring'. A feature of this category of monitoring is that the programs are subject to explicit requirements that address the monitoring objectives and details (e.g., timing, frequency, parameters, indicators, analytical methods, reporting formats).

Aquaculture operations are highly regulated by both provincial and federal governments. All land-based and sea cage operations require an aquaculture licence from the provincial Department of Fisheries and Land Resources (DFLR). Several federal agencies also provide regulatory oversight. Fisheries and Oceans Canada (DFO) regulates the aquaculture through the *Fisheries Act* and the Aquaculture Activities Regulations (AAR), while other federal regulations are enforced by Transport Canada, Canadian Food

Inspection Agency (CFIA), and Environment and Climate Change Canada-Canadian Wildlife Service (ECCC-CWS).

Since 1999, DFLR, DFO and the salmonid industry have implemented a management strategy called the Code of Containment for the Cage Culture of Salmonids in Newfoundland and Labrador (COC). The COC is focused on the establishment of design and performance standards to minimize escapements from sea cages and related aquaculture operations. Grieg NL is committed to conformance with the COC and anticipates that it will meet or exceed the applicable standards.

Additionally, Grieg NL will also comply with the Norwegian Standards (NS9415:2009) for its sea cage system as supplied by Aqualine. These standards address such topics as site surveys, risk analyses, design standards, equipment dimensioning, and procedures associated with production, installation and operation.

The EIS provides details on the monitoring activities associated with regulatory compliance, including adherence to the COC and the Norwegian Standards. These requirements as well as the Grieg NL plans for compliance are summarized in Table 1 in Section 2.1. A summary of candidate environmental effects monitoring and follow-up programs is provided in Table 2, followed by overview descriptions of the programs.

Table 2. Summary of Candidate Environmental Effects Monitoring and Follow-up Programs.

#	Title/Description	Location*	Project Phase	Monitoring Type
1.0	Sediment Control	RAS Hatchery	Construction	Surveillance; Compliance
2.0	Breeding Birds	RAS Hatchery	Construction	Surveillance; Compliance
3.0	Blasting	RAS Hatchery	Construction	Surveillance; Compliance
4.0	Hatchery Water Quality Groundwater-monitoring to be developed in consultation with the Water Resources Management Division of the Department of Municipal Affairs and Environment	RAS Hatchery	Construction; Operations	Surveillance; Compliance
5.0	Hatchery Fish Health	RAS Hatchery	Operations	Surveillance
6.0	Hatchery Accidental/Unplanned Events			
6.1	Fish Escape	RAS Hatchery	Contingency	Surveillance; Compliance
6.2	Spill	RAS Hatchery	Contingency	Surveillance; Compliance
7.0	Hatchery Decommissioning	RAS Hatchery		
8.0	MetOcean			
8.1	Water Column	Sea Cage Sites	Construction; Operations	Surveillance
8.2	Climate and Meteorology	Sea Cage Sites	Construction; Operations	Surveillance; Compliance
8.3	Ice	Sea Cage Sites	Construction; Operations	Surveillance
9.0	Sea Cages Performance of the Aqualine Midgard sea cages in the waters of Placentia Bay	Sea Cage Sites	Construction; Operations	Surveillance Compliance
10.0	Benthic Habitat	Sea Cage Sites	All Phases	Compliance; EEM

#	Title/Description	Location*	Project Phase	Monitoring Type
	Benthic monitoring, consistent with baseline and operational monitoring requirements of the provincial Aquaculture Activities Regulations and associated Aquaculture Monitoring Standard.			
11.0	Marine Ecosystem Biological diversity, composition, abundance, distribution and habitat utilization of fish, marine mammals and seabirds.	Sea Cage Sites	All Phases	Surveillance; Compliance
12.0	Wild Salmon	Sea Cage Sites	Construction; Operations	Research; EEM (TBD **)
13.0	Bird Entanglement	Sea Cage Sites	Construction; Operations	Surveillance
14.0	Marine Mammals and Sea Turtles	Sea Cage Sites	Construction; Operations	Surveillance
15.0	Species at Risk	Sea Cage Sites	Construction; Operations	Surveillance
16.0	Seawater Quality	Sea Cage Sites	Construction; Operations	Surveillance
17.0	At-sea Fish Health Performance of triploids - growth, survival, health, fitness, and pathogen susceptibility.	Sea Cage Sites	Operations	Surveillance; Compliance
18.0	Marine Accidental/Unplanned Events			
18.1	Sea Cage Fish Escape	Sea Cage Sites	Operations	
18.2	Marine Spill	Sea Cage Sites	Construction; Operations	
18.3	At-sea Use of Therapeutants or Antibiotics	Sea Cage Sites	Operations	
19.0	Decommissioning	Sea Cage Sites		
20.0	Cumulative Effects	Sea Cage Sites	All Phases	
21.0	Socio-economic			
21.1	Training	RAS Hatchery; Sea Cage Sites	Construction; Operations	Surveillance
21.2	Equity and Local Benefits	RAS Hatchery; Sea Cage Sites	All Phases	Surveillance; Compliance
21.3	Resource Users	RAS Hatchery; Sea Cage Sites	All Phases	Surveillance
*Note: 'Sea Cage Sites' includes all associated marine activity, including all vessel traffic				
**TBD: To be determined				

3.0 Proposed Land-based Monitoring Programs

The proposed land-based monitoring programs are presented below, categorized by project phase.

3.1 Construction Monitoring

The RAS Hatchery site is located in an Industrial Park within the municipality of Marystown. As part of its environmental protection planning, Grieg NL will carry out appropriate monitoring of land-based construction activities.

3.1.1 Sediment Control

Sediment control will be undertaken by third-party contractors and will adhere to current Industry Best Practices for managing erosion and sedimentation in accordance with municipal, provincial and federal

regulations. Sediment control structures will be installed, maintained, and repaired on a scheduled basis (weekly, at a minimum) and before/after rainfall events forecast to exceed 10 mm. Monitoring will include visual inspections to determine effectiveness and structural integrity of the structures. Reporting will employ standardized forms to document performance and to identify any need for remedial or corrective action. Documentation will include photographs where appropriate.

3.1.2 Breeding Birds

If future site clearance activities are scheduled to occur during bird breeding periods, the area will be monitored/visually inspected by construction monitoring personnel. If any evidence of nesting activity is detected, clearing will be delayed, and a bird specialist consulted to identify actions necessary to avoid any disturbance during egg incubation and early rearing.

3.1.3 Blasting

A licensed, qualified and experienced contractor will be hired to conduct all drilling and blasting operations and to ensure that permitting requirements are met. As per the operations permit and relevant legislation, explosives will not be stored or remain on-site overnight.

Blasting patterns and procedures will be developed to minimize seismic impact within the pre-blast survey zone and proper techniques to reduce flyrock potential will be utilized. A blast site safety manual will be required from the licensed contractor. Key aspects of this manual, including a blasting warning protocol (i.e., horns and/or sirens) and a site employee muster station area will be reviewed with site personnel prior to blasting operations. Prior to any blasting activity, the site will be surveyed for sign of animals such as moose or black bear. As necessary, blasting will be delayed until any detected animals have left the site.

3.2 Operations Monitoring

As noted earlier, the RAS Hatchery site is located in an Industrial Park within the municipality of Marystown. As part of its environmental protection planning, Grieg NL will carry out appropriate monitoring of land-based operations activities.

3.2.1 Water Quality

As an integral part of the aquaculture operation, water quality will be continuously monitored throughout all stages of salmon growth.

Water quality will be monitored and maintained at optimal conditions for growth during first-feeding, smoltification, and post-smolt production. A routine program will be established for monitoring, measuring, and recording water quality parameters that include but are not limited to temperature, pH, dissolved oxygen, nitrate, nitrite and total dissolved solids in all buildings of the RAS Hatchery.

In consultation with the Water Resources Management Division of DMAE, Grieg NL will design and implement a groundwater monitoring program to monitor water quality and levels of the RAS Hatchery production well. Based on preliminary discussions with the Water Resources Management Division

(D. Hanchar, Manager, Groundwater Resources, DMAE, pers. comm., 26 July 2018), the groundwater monitoring program requires three primary components:

- (1) Identification of a recharge area (i.e., well) and wellhead protection area;
- (2) Completion of a risk assessment to identify issues that may affect water quality; and
- (3) Use of shallow water wells within the identified recharge area to monitor water levels.

The locations and numbers (maximum of five) of shallow water wells that will be drilled and monitored will be determined at a later date in consultation with the DMAE as per standard regulations and used in other similar situations. Grieg NL is committed to implementing a groundwater monitoring program and will work with the DMAE to ensure that a secure and reliable water resource is available for the RAS Hatchery. Monitoring results will be provided to the DMAE as required.

3.2.2 Fish Health

Monitoring will be implemented to measure the performance of European-strain triploids at all stages in their development, from receipt of eyed eggs to the harvesting of commercial-sized fish. The monitoring program will apply to both the RAS Hatchery operation as well as during the period of holding in sea cages. Parameters to be measured include growth rates, survival rates (mortalities), health, fitness, and pathogen susceptibility.

Grieg NL will adhere to the best practices included in Appendix 6 of the COC, including those for grading, weight sampling, sea lice counts, transportation, well boat treatments, and harvesting.

Specific fish health monitoring programs include biosecurity measures, routine husbandry practices, health checks and procedures, use of specialized feed and feeding procedures, sea lice control procedures, water quality monitoring, vaccinations, and removal and treatment of dead fish.

Prior to being shipped to Newfoundland, eyed eggs will be tested and certified as disease-free. Records of time, source, and location of eggs will be maintained. During incubation, eggs will be monitored, and nonviable eggs promptly removed to eliminate fungal growth.

Fish mortalities as well as moribund fish will be visually assessed and collected at least daily via a port on each tank. Mortalities will be immediately transported to a centralized ensilage tank. Records will be kept of all mortalities and the handling/disposal specifics.

Salmon at each stage of development will undergo health checks and procedures to minimize health risks and detect the early onset of any disease. A private veterinarian will be used to respond to signs of health issues and to conduct routine monitoring prior to each transfer of fish to a new facility. Staff and management will work closely with this private veterinarian to communicate any indication of health or disease concerns. Staff will be trained to be familiar with normal fish appearance and behavior and will be aware of the importance of relating any observed changes to supervisors or management.

Routine parasite screening and diagnostic testing will also be conducted. A schedule will be established in consultation with provincial authorities and a private veterinarian.

A passive surveillance program along with diagnostic testing will also be performed by provincial veterinarians. Video monitoring will be employed to reduce feed wastage and provide feedback on the use of established feeding tables/software. Salmon will be monitored during feeding and feed delivery will cease once they have reached ~80-90% satiation.

Maintaining security at the hatchery facility is an important aspect of disease prevention. A CCTV system will be installed both outside and inside the RAS Hatchery in order to monitor many of the vulnerable areas, public access points and adjacent streets. The system will be monitored by security from a Security Control Room. Perimeter breach, intruder and panic alarms will be installed and continuously monitored from the Security Control Room, and security will respond immediately to these alarms. Members of the security team will carry out routine patrols of the buildings to provide a visible deterrent to trespassing.

3.2.3 Accidental/Unplanned Events

3.2.3.1 Escape

Since the land-based RAS system for Grieg NL is a closed system, it is not possible for any fish to escape from the system into nearby waterways. There is, however, a chance that fish could escape during transfer from the Post Smolt facility to the well boat prior to transport to sea cages. However, to prevent such an event, Grieg NL will undertake monitoring and preventative actions in advance. Should an escape occur, Grieg NL will adhere to the procedures as detailed in the COC and as outlined for an escape from a marine cage (Section 4.11.1).

3.2.3.2 Spill

In the event of a spill of pollutant material, one aspect of the Spill Response Plan will be to determine the area affected by the spill, as well as measurement of the success of recovery efforts. Results will be incorporated into each Incident Report.

Grieg NL has reviewed and intends to follow guidelines and recommendations as developed by the DMAE, ECCC, Transport Canada, DFO, and Canadian Coast Guard. Incident reporting, status reporting, and final closure will encompass the full range of potential spills; however, special attention will be paid to spills of petroleum products and other potentially toxic substances as per Transport Canada's Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants, 2nd Edition, July 2009.

3.3 Decommissioning

A plan will be developed, with input from regulatory agencies, which outlines procedures for shutting down operations at the RAS Hatchery and the sea cage sites. The plan will clearly explain the approach and mitigation and monitoring details regarding removal of all fish and fish products, waste, chemicals, equipment and infrastructure.

4.0 Marine-based Monitoring Programs (Construction and Operations)

The proposed marine-based monitoring programs are presented below.

4.1 MetOcean

Components of the MetOcean monitoring during the construction and operations phases of the marine-based project activities will include water column monitoring, climate and weather monitoring, and ice monitoring.

4.1.1 Water Column

A multi-year environmental monitoring project involving the deployment of an Acoustic Doppler Current Profiler (ADCP) and multiple probes at the Rushoon, Merasheen and Red Island Bay Management Areas (BMAs) will be conducted. Each of the three ADCPs will be deployed at a 40-m depth to collect current profile data in 4-m depth cells in the upper 40 m of the water column at each BMA. In addition, multiple probes will be installed on the ADCP mooring lines at selected depths above the current profiler to collect data on water temperature, wave profiles, conductivity, salinity, pH, total dissolved solids, and dissolved oxygen. These data will provide information on water quality at the sea cage sites, information relevant to both the quality of fish and fish habitat, and the health of fish in the sea cages.

4.1.2 Climate and Meteorology

Climate and meteorological data in the study area, including monthly and annual minimum, maximum and mean values for precipitation, temperature and wind speed, prevailing wind direction, ice dynamics and storm events, will be collected from Public Weather stations and websites such as Smart Atlantic Alliance, Wood, and ECCC in collaboration with data collected on site using equipment on Grieg NL barges. Ice data will be collected using the Canadian Coast Guard Marine Communications and Traffic Services (MCTS) as well as on-site observation.

4.1.3 Ice

All sea cages will be routinely monitored for ice accretion by either personnel on site or video camera. Ice accretion will be minimized by personnel removing ice as it accumulates, which is typically done with rubber mallets.

During the pack ice season, broadcasts and reporting on ice occurrence and distribution will be monitored at least daily from the MCTS. Guidance and advice related to predicted timing and extent of any pack ice (or iceberg) incursions will be sought.

4.2 Sea Cage Performance

Grieg NL will monitor sea cage performance to ensure the structural integrity of the system. Special attention will be paid to particular features (e.g., netting) that ensure the security of the caged salmon. Nets will be visually inspected at least every 90 days by an ROV. ROVs will also be used for *in situ* net

repair, if required. If a net is repaired, this will be a temporary fix until a replacement net can be installed and the repaired net removed for inspections and repairs or replacement. Replacement nets for each site will be maintained in storage and this procedure will occur as soon as feasible based on weather and logistics.

Surface components of mooring systems, cages, nets and ropes on each site will be inspected once per week and the status recorded. Underwater components of the mooring system, including the anchors, will be inspected based on a schedule developed in consultation with Aqualine and approved by DFO or DFLR.

Periodic audits of the cage system, as specified in COC Procedures for Compliance, will be conducted and DFLR will arrange for audits of net testing procedures. Audits by DFLR will be conducted at least twice per year, once in the spring after cages are stocked with fish, and once in the fall/early winter).

Results of monitoring of bioaccumulation on the sea cages will be used to establish a cleaning schedule. Nets will typically be cleaned weekly and cages will be cleaned once or twice during heavy fouling periods. Routine checks of equipment utilizing underwater cameras, Remotely Operated Vehicles (ROVs), and divers will be used to validate the cleaning schedule of the sea cages.

A Closed-circuit Television (CCTV) system will be installed around the sea cages and it will be monitored primarily by personnel on the feed/accommodation barge and in the Security Control Room at the RAS Hatchery.

4.3 Benthic Habitat

The Monitoring Protocol for Hard Bottom Benthic Substrates under Marine Finfish Farms in Newfoundland and Labrador will be followed. These surveys will constitute a benthic monitoring program as prescribed by the AAR and associated Aquaculture Monitoring Standard.

Drop camera and/or ROV-mediated underwater surveys of benthic habitat will be conducted under and adjacent to the sea cages to assess the deposition of organics from the sea cages during routine operations.

The program will assess both the amount of deposition and the visual bioindicators of organic enrichment, including the presence and off-gassing of flocculent matter (dark layer of decomposing fish feces and pellets which covers the seabed), the formation of white *Beggiatoa* (bacterium) mats that indicate hypoxic/anoxic conditions and the production of sulphur, the occurrence of opportunistic polychaete complexes (OPC), and/or the occurrence of barren sites (i.e., absence of organisms) (Hamoutene et al. 2016²; Salvo et al. 2017³).

Surveys will be conducted in accordance to AAR regulations to allow for assessment of benthic habitat recovery time. If conditions allow, samples of the deposited organic material at the sea cage sites will be collected and analyzed for selected parameters (e.g., sulfide levels, infauna).

² Hamoutene, D., F. Salvo, S. Donnet, and S.C. Dufour. 2016. The usage of visual indicators in regulatory monitoring at hard-bottom finfish aquaculture sites in Newfoundland (Canada). *Mar. Poll. Bull.* 108: 232-241.

³ Salvo, F., J. Mersereau, D. Hamoutene, R. Belley, and S.C. Dufour. 2017. Spatial and temporal changes in epibenthic communities at deep, hard bottom aquaculture sites in Newfoundland. *Ecol. Indic.* 76: 207-218.

4.4 Marine Ecosystem

As concluded in the EIS, one of the primary negative effects on the marine ecosystem associated with finfish aquaculture operations is the potential for accumulation of organic waste (i.e., excess fish feed, fish feces, and biofoulants cleaned from the cages) on the seabed below and adjacent to the sea cages. This accumulation of organics could potentially cause chemical, physical and biological changes to the surficial sediment. This potential Project-environment link is addressed by the proposed benthic Monitoring Program (see Section 3.2 above). Other interaction links can be challenging to develop, especially with respect to identification of a credible hypothesis or implementation of a suitable sampling and testing protocol.

In addition to the obvious benthic link, there are other potential interactions between the sea cage operations and the water column. For example, there is potential for the transfer via the water column of disease and/or parasites from farm fish to wild fishes. Note there is little evidence to support this for non-salmonid fishes. Other interactions include the potential for displacement of farm fish from the sea cage sites or for physical contact between the cages and larger marine animals such as marine mammals, sea turtles, river otters, birds and some fish species. Such interactions could be triggered by the presence of the sea cages in an established travel route or, more likely in the case of some species, as a consequence of individuals being attracted to the area by the presence of food sources.

A review and consideration of ecological links will need to be undertaken, and research questions developed to address potential monitoring targets. Candidate study programs would likely focus on the potential for biofouling organisms to provide a monitoring target for a potentially credible and measurable sampling program.

4.5 Wild Salmon

The primary potential negative effects on wild salmon associated with finfish aquaculture operations is the potential for escaped farm salmon to breed with wild salmon, thereby affecting the genetic integrity of wild salmon stocks, and the potential transfer of disease and parasites from farm salmon to wild salmon.

Grieg NL will work with DFO to establish counting fences in at least two rivers proximate to each active BMA. These would serve as stations for both routine and post-escape monitoring of Atlantic salmon (see Section 3.13.1 – Fish Escape Monitoring). Both genetic analysis and Environmental Deoxyribonucleic Acid (eDNA) water sampling would be conducted during routine monitoring. The primary objective is to assess the genetic integrity of the salmon in the rivers.

If routine monitoring results in a lack of evidence supporting the use of salmon rivers by Grieg NL farm salmon, then the routine monitoring will be ended after a suitable time frame determined through consultation with DFO. If the presence of farmed salmon in the rivers is detected but the farmed fish are not from Grieg NL operations, then the responsibility of routine monitoring should be shifted to the source farm. Grieg NL believes that all data collected during both routine and post-escape monitoring of Atlantic salmon rivers should be made available to the public.

4.6 Bird Entanglement

The primary negative effects on birds associated with finfish aquaculture operations is the potential for entanglement in the sea cages and anti-predator nets, and attraction to artificial lighting at night which could lead to bird collisions with vessels.

Workers at the sea cage sites will monitor for any bird entanglements and strandings and follow established procedures to release any birds that do entangle or strand. A record will be kept of all entanglements and strandings, and include data such as species, time, date and location of the incident. There will also be a description of any damage incurred, as well as recommendations or observations on possible preventative measures.

4.7 Marine Mammals and Sea Turtles

Of the three baleen whale Species at Risk (SAR) that are known to occur in Placentia Bay (North Atlantic right, blue, and fin whales), only fin whales are expected to regularly occur there. In addition, the endangered leatherback sea turtle occurs regularly in Placentia Bay. The primary types of effects identified for marine mammals and sea turtles include entanglement, loss of habitat, vessel strikes, and disturbance from noise.

Potential entanglement and loss of habitat for marine mammals and sea turtles are related to the physical presence of sea cages and associated mooring systems. Sea cage mooring and buoy lines will be inspected on a regular basis to ensure they are kept tensioned and in order to avoid loose ropes in the water.

Each cage will have one or two cameras that offer 360 degree viewing and can be raised and lowered within the water column. The cameras can serve to record the presence of marine mammals and sea turtles (or other large marine animals such as sharks and tuna). Farm fish behaviour will be monitored by operations staff from the control center for indications that a predator may be nearby.

Any entanglement of marine mammals and sea turtles (as well as river otters and wild fish) will be reported to DFO. Action will be taken, in consultation with DFO and the Whale Release and Strandings Group, to free or remove the animal.

4.8 Species at Risk

Sightings of any SAR either at the sea cage sites or during transit to the sea cage sites will be recorded.

Personnel will receive training from experienced biologist(s) on how to identify various birds, marine mammals, sharks, tunas, and sea turtles, and the associated data recording procedures. Data will be submitted to DFO and ECCC-CWS as appropriate.

Vessel crew will maintain watch for marine mammals/sea turtles and alter course and speed as appropriate to avoid collision with marine mammals and sea turtles. Vessel crew will be prohibited from approaching marine mammals and sea turtles.

4.9 Seawater Quality

As an integral part of the aquaculture operation, water quality will be continuously monitored throughout all stages of salmon growth.

A routine program will be established for monitoring, measuring, and recording water quality (temperature, salinity, and oxygen level, at a minimum) at all active sea cage sites on a daily basis throughout the Project. Plankton sampling will be conducted weekly, followed by sample analysis and data recording. Data will be used to evaluate the severity of any environmental issues such as fouling or changes in physio-chemical data, leading to a response.

During transport of smolt from the RAS Hatchery to the sea cage sites, water quality in the hold of the well boat will also be monitored.

4.10 At-sea Fish Health

Monitoring will be implemented to measure the performance of European-strain triploids at all stages in their development, from receipt of eyed eggs to the harvesting of commercial-sized fish. The monitoring program will apply to both the RAS Hatchery operation as well as during the period of holding in sea cages. Parameters to be measured include growth rates, survival rates (mortalities), health, fitness, and pathogen susceptibility.

Grieg NL will adhere to the best practices included in Appendix 6 of the COC, including those for grading, weight sampling, sea lice counts, transportation, well boat treatments, and harvesting.

A Fish Health Management Plan will be implemented to ensure fish health is optimized. Routine parasite screening and diagnostic testing will be conducted. A schedule will be established in consultation with provincial authorities and a private veterinarian. Sea lice levels on salmon will be monitored weekly when water temperatures exceed 4°C and weather conditions are suitable. If monitoring indicates an increase in sea lice levels, Grieg NL will seek guidance from private and provincial veterinarians.

A passive surveillance program and diagnostic testing will also be performed by provincial veterinarians.

Video monitoring will be employed to reduce feed wastage and provide feedback on the use of established feeding tables/software. Farm salmon will be monitored during feeding and feed delivery will cease once they have reached ~80% satiation.

In situ data loggers will be installed on the barges at each sea cage site as well as on each individual cage. These loggers will collect data on temperature, oxygen levels, current speed and direction, pH and salinity. Data will be wirelessly transmitted to centralized computer stations on the barges and at the control center in Marystown for either real-time viewing or logged for historical collections.

The number of fish mortalities will be recorded daily. Records will be maintained for each transfer and include such data as date, time, number, and weight of fish. All handled fish will be closely monitored for a period post-handling. During fish transfers between tanks and facilities, fish will be carefully monitored and counted. A reinforced, continuous hose extending ~50 m from the shoreline to the well

boat will be used to transfer fish. It will sit at the water's surface and will be continuously monitored by personnel. Fish will be counted by fish counter as well as being monitored via video as they exit the hatchery, and as they enter the well boat. The day prior to transport, all equipment to be used will be checked and prepared, including examination of the pipe and hose for breaches. A checklist will be followed on the day of transfer.

Fish mortalities as well as moribund fish will be visually assessed and collected at least daily from each sea cage. Mortalities will be immediately transferred to an ensilage tank. Records will be kept of all mortalities and their handling/disposal.

4.11 Accidental/Unplanned Events

4.11.1 Escape

Extensive monitoring will be employed to prevent conditions that could lead to an escape of farmed fish (see Section 3.7.2, Fish Health Monitoring at Sea, and Section 3.4, Sea Cage Performance).

As per the COC (see Section 2.5.2.2), in the event of an accidental escape of fish from sea cages, Grieg NL must contact DFO and DFLR before initiating any response effort. Any attempt to recapture escaped fish requires DFO approval.

The follow-up monitoring in the event of an accidental escape of farm fish would involve sampling Atlantic salmon in scheduled salmon rivers located nearest the location of the escape in order to determine whether escaped farm salmon have entered the freshwater systems.

Sampling would involve the collection and analysis of blood samples which will provide information such as source of the fish (i.e., wild or farm), the broodstock of the fish, and whether or not the fish is triploid and/or female. It may also be necessary to collect fish tissue (i.e., fin clips) for genetic analysis. Given DFO's expertise in genetic analysis of Atlantic salmon, Grieg NL proposes to design and conduct the follow-up monitoring for farm salmon in the rivers in collaboration with DFO scientists. Details associated with fish escape monitoring will be determined before any salmon are placed in sea cages.

4.11.2 Spill

In the event of a spill of pollutant material, one aspect of the Spill Response Plan will be to determine the area affected by the spill, as well as measurement of the success of recovery efforts. Results will be incorporated into each Incident Report.

Grieg NL has reviewed and intends to follow guidelines and recommendations as developed by the DMAE, ECCC, Transport Canada, DFO, and Canadian Coast Guard. Incident reporting, status reporting, and final closure will encompass the full range of potential spills; however, special attention will be paid to spills of petroleum products and other potentially toxic substances as per Transport Canada's Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants, 2nd Edition, July 2009.

4.11.3 Therapeutants and Antibiotics

Should the use of therapeutants or antibiotics become necessary, Grieg NL will attempt to collect samples of deposited organic material in the vicinity of the sea cages and analyze the samples for presence of chemicals found in these substances. Benthic fauna may also be collected and analyzed to determine the likelihood of bioavailability of the substances. This will provide information about the quantity and persistence of these chemicals on the seabed. Grieg NL will adhere to the requirements of the AAR.

4.12 Decommissioning

A plan will be developed, with input from regulatory agencies, which outlines procedures for shutting down operations at the RAS Hatchery and the sea cage sites. The plan will clearly explain the approach and mitigation and monitoring details regarding removal of all fish and fish products, waste, chemicals, equipment and infrastructure.

4.13 Cumulative Effects

Grieg NL will cooperate with other proponents who are conducting monitoring programs within its area of operations. In cases where these monitoring programs include components similar to those in the Grieg NL EEMP, data sharing will be offered, and discussions held to compare data collection and analysis methods.

Some examples where this EEMP can contribute to an evaluation of cumulative effects include:

- Records of marine traffic in the area of Grieg NL sea cage operations could be shared with others who are monitoring this activity;
- MetOcean data collection can contribute to an improved understanding of oceanographic phenomena within Placentia Bay; and
- Weather observations can be reported and made available to the climate network.

5.0 Socio-economic Issues

Grieg NL has committed to several initiatives aimed at achieving equity in the workplace, encouraging a diverse work force drawn from the region, and providing a safe and encouraging workplace that facilitates training and advancement within the organization. Grieg NL is also committed to cooperate with other resource users and avoid or minimize any potential negative interactions.

Grieg NL plans to continue its cooperation with local institutions to ensure training opportunities are available for actual and potential employees and contractors. Grieg NL will monitor its efforts and degree of success in achieving a diverse workforce, including both employees and major (prime) contractors.

The company will use various means to gather information on the outcomes of its initiatives, including discussions with workers, supervisors and management which may take the form of workplace committees, focus groups (both formal and informal), exit surveys, and other mechanisms.

Grieg NL will also continue its proactive program of communication with communities, other resource users, local commercial fishers, stakeholder groups, and development organizations.

5.1 Training

Grieg NL will continue to work with the public and private training institutions on the Burin Peninsula and elsewhere to deliver industry specific and supportive learning opportunities. Efforts will focus on ensuring that necessary training is available to provide qualified personnel as candidates for both direct employment and indirect employment through contractors. Grieg NL will monitor and facilitate the efforts and success of training of local employees/contractors, including hands-on training by the major suppliers and training provided to workers and contractors.

A record of all employees and contractors who have received training will be maintained. Data will be aggregated and organized for presentation in a manner that illustrates the success of training initiatives yet maintains individual confidentiality. Grieg NL will access available records from training institutions to remain informed of the available pool of trained individuals present in the Placentia Bay area.

5.2 Equity and Local Benefits

Based on the principle of continuous improvement and through an on-going adaptive management approach, Grieg NL will monitor and evaluate its Women's Employment Plan objectives and initiatives and adjust the plan as required.

Grieg NL will establish a four-person committee comprised of the General Manager, the Human Resources Manager and two other staff to monitor the Women's Employment Plan and program. This Committee will meet at least annually to review the company's performance. Any recommendations for changes arising from this feedback will be considered with respect to safety, productivity and cost, and a plan for execution of any necessary corrective measures will be developed.

Reports on performance, beginning with the commencement of Project construction and extending at least into the initial two to three years of operation (i.e., until such time as the entire Project workforce is in place and has largely stabilized), will be produced. The nature and frequency of reporting will be determined in consultation with the Women's Policy Office. It is anticipated that the reports will include employment data by identified group and occupation (National Occupational Classification or NOC) during the implementation phases of the Project. The reporting will indicate the number of individuals and total work hours undertaken during the Project for the reporting period in question. Data will be organized by gender, age category, ethnicity, and home community. All reporting will be based on self-declaration, and appropriate measures will be implemented to ensure that confidentiality is respected and protected.

Grieg NL has advised their major contractors and suppliers of the requirement for best efforts regarding local employment, training and procurement, and will monitor their efforts and success for continuous improvement. Grieg NL will require contractors to report on their performance regarding diversity in hiring and employee retention.

Grieg NL will report to the Government of Newfoundland and Labrador on the Plan's implementation and outcomes. Specifically, this will involve regular reporting to the Minister Responsible for the Status of Women on the implementation of the various initiatives outlined in this Plan.

Grieg NL will continue its proactive program of communication with communities, local commercial fishers, stakeholder groups, and development groups to ensure that the Project benefits are realized, and concerns addressed.

5.3 Resource Users

Grieg NL will ensure that other users of Placentia Bay are aware of the sea cage operations and monitoring will be conducted to identify and avoid any potential for negative interactions with users of the area. Each sea cage site will be clearly marked according to regulatory requirements. Sea cage sites will be delineated with a series of highly visible marker buoys, radar reflectors, and strobe lights. Grieg NL will use several small vessels for activities such as crew changes, consumables supply, and fish transport. Grieg NL vessels will follow established transit routes and observe vessel speed limits (10 knots or 18.5 km/h). A record will be kept of all observed non-Project traffic within the Grieg NL operating areas and there will be annual reporting of any incidents with other resources users.

6.0 Program Implementation

The design structure for each selected monitoring program will be described both generically as well as to a high level of technical detail. The generic description will include the following:

- Program title
- VEC
- Monitoring target/Indicator (i.e., predicted environmental effect or mitigation measure effectiveness)
- Monitoring category (i.e., compliance, research, surveillance, EEM)
- Design type (e.g., radial gradient, before-after comparison, control-exposure)
- Measurable parameter and endpoints
- Key project interactions
- Questions for hypothesis formation
- Objective
- Threshold
- Scope of monitoring work
- Agency/partner participation

The details of each monitoring program will include as much descriptive material as is available and be required to provide a set of specific information that can be used to guide data collection, analysis and reporting. Examples of the specific information are as follow:

- Testable hypothesis (if applicable)
- Sample size requirements (levels of replication)
- Sampling frequency

- Sampling location(s)
- Sampling timing
- Data collection methods
- QA/QC sampling requirements
- Sample handling and analysis
- Data interpretation and reporting
- Triggering levels (thresholds)

Appendix A provides a generic outline of the program presentations, and Appendix B provides detailed descriptions of each selected program. In several cases, details are yet to be developed. As program definition is carried out, the identified descriptors will be finalized.

The EEM program will be implemented during the Operations phase of the Project. An overview of the proposed program and schedule for implementation during the Operating period of the Project is presented in Table 3. Since the start of Operations will be 2019, not all programs will commence in that year. The annual cycle for a typical year is provided in Table 4.

In general, EEM programs will be carried out by Grieg NL EH&S Site personnel. In cases where a specialist skill is required, qualified consulting firms will be retained to conduct the work.

Table 3. EEMP Master Schedule (tentative).

Subject	Frequency	0	1	2	3	4	5	6	7	8	9	10	10+	
	Seasonally/ continuous													
	First 3 yrs; then every 3 rd yr													
	Every 3 rd yr													
	Every 2 nd yr													
	1 st three yrs; then every 3 rd yr.													
	1 st two yrs; review after 2 nd yr													
	Once only (Research)													
	Seasonally													
	Every 3 rd yr.													
	Once only (Research)													
	Once only (Research)													
	Opportunistic													
	Opportunistic													

Table 4. EEMP Monthly Schedule (tentative).

EEM Subject	Frequency	Annual Cycle											
		J	F	M	A	M	J	J	A	S	O	N	D
	Seasonally/ continuous												
	First 3 yrs; then every 3 rd yr												
	Frequency not certain												
	Bi-annually												
	Every 3 rd yr.												
	Review after 2 yrs												
	Once only, Presence survey												
	Seasonally												
	Every 3 rd yr.												
	Disturbances & Zone of Influence (ZOI)												
	Once only												
	Opportunistic												
	Opportunistic												

Appendix A
Guide to Descriptive Tables

Monitoring programs are described in summary form tables. An explanation for each topic is provided below. For some programs, more detailed information is also included as available.

Table A – Summary Description	
VEC	Refers to the Valued Environment Component as per the EIS
Monitoring Target/Indicator	The postulated receptor associated with a project activity/component, and the measurement indicator associated with the target.
Monitoring Category	Research, surveillance or full EEM. Where a program is prescribed in regulations or permit conditions, it is also referred to as compliance monitoring.
Design Type	Sampling design, methodology. Common EEM types include Control-Exposure; Before-After; Before-After Control-Impact (BACI); Gradient (transects from source to background). For regulatory compliance monitoring, the design type is described as "compliance", (i.e., the sampling design will be prescribed, with any flexibility constrained by the requirement to conform to approval conditions).
Measurable Parameter and Endpoints	Selected measurable parameter and indicators to be monitored. These may be based on standards or guideline values for specific parameters and media.
Key Project Interactions	A description of the phenomena of concern and the associated environmental issue(s). Provision of a statement of the link between a Project aspect and the monitoring target/indicator.
Questions for Hypothesis Formation or Monitoring Goal	Speculative statements as to the possible interaction and potential effect on the environmental receptor. These questions may be developed into testable hypotheses.
Objective	Objectives of the monitoring program in relation to EIS predictions, regulatory requirements, or issues of concern as identified through the EIA process and public consultation.
Threshold	A value or proportionate change that confirms an effect and triggers action. Applicable thresholds can include exceedances of: background or baseline data by a prescribed percentage; an established "no observable effects" concentration; "meaningful change" thresholds; "statistically significant" change; or, levels known to cause an environmental effect.
Scope of Monitoring Work	Limiting parameters that define the program, including geographic extent and duration.
Agency/Partner Participation	Cooperating agencies and organizations, including regulatory authorities as applicable.

Table 1.1 b – Definition Specifics	
Testable Hypothesis	The formation of testable hypotheses is critical to the clear development of a study design. For full EEM, at least one scientifically valid and robust hypothesis statement is required.
Sample Size Requirements (Levels of Replication)	A description of sample volume requirements, sampling device capacity, field replicates and duplicates. Numbers of samples per site; number of sites per location; number of locations per sampling effort.
Sampling Frequency	A schedule for collection of monitoring data. Frequency, duration and geographic extent of monitoring programs.
Sampling Locations	Geographic location of sampling locations and media.
Sampling Timing	Seasonal and diurnal considerations.
Data Collection Methods	Specific protocols for collection, retrieval, storage, preservation, packaging and transport of collected samples.
QA/QC Sampling Requirements	Field protocols; data handling and management; laboratory protocols; specimen archiving.
Sample Handling and Analysis	Documentation of collection, labelling, packaging, preservation and timing for delivery to analysis facility. Laboratory analysis protocols and techniques as appropriate. Sample and specimen archiving requirements as applicable.
Data Interpretation and Reporting	Documentation, validation, statistical analysis and reporting format for data and metadata.
Triggering Levels	Criteria for initiating a response.

The following acronyms have been used:

TBD = to be determined

NA = not applicable

Appendix B
Monitoring Program Descriptions

Appendix B-1
RAS Hatchery – Construction Monitoring

- 1.0 – Sediment Control**
- 2.0 – Breeding Birds**
- 3.0 – Blasting**

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Program 1.0 - Sediment Control

Table 1a - Summary Description of Sediment Control Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Water/Suspended solids
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Total Suspended Solids (TSS)
Key Project Interactions	RAS Hatchery site construction – grubbing and contouring. Site drainage could contain high levels of silt and suspended material
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Ensure offsite water quality is not impaired, and evaluate potential changes in water quality due to Project activities
Threshold	1) Early warning indicator: visual changes to water colour 2) Exceedance threshold – TSS (opacity; conductance): CCME/PEL
Scope of Monitoring Work	Maintain monitoring watch and, as required, sample collection and analysis, throughout construction operations involving surface material disturbance
Agency/Partner Participation	TBD

Commented [JC1]: Canadian Council of Ministers of the Environment
Probable Effect Level

Table 1b - Sediment Control Monitoring - Definition Summary	
Testable Hypothesis	NA - Compliance monitoring
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Sporadic during construction or more frequently depending on site activity and water presence
Sampling Locations	Site development area - downgradient from control structures
Sampling Timing	During and following rain events that have been forecast to exceed 10 mm
Data Collection Methods	Standard water sampling protocol; TSS or conductance field meter, with laboratory validation as required
QA/QC Sampling Requirements	TBD - 10 % field duplicates for lab analysis
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	CCME-PEL

Program 2.0 - Breeding Birds

Table 2a - Summary Description of Breeding Birds Monitoring	
VEC	NA
Monitoring Target/Indicator	Breeding pairs of birds
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Presence/absence of breeding pairs of birds
Key Project Interactions	RAS Hatchery site construction - disruption of breeding, egg incubation/nesting, and rearing of young due to construction activity
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Avoid any disturbance to breeding birds/ eggs/juveniles.
Threshold	Early warning indicator – presence of birds (visual, auditory cues) or nests
Scope of Monitoring Work / Approach	Surveillance level monitoring of breeding bird presence during heavy equipment deployment and surface disturbance A single field program conducted over one summer season during Year 1 of construction, depending on time of year
Agency/Partner Participation	TBD

Table 2b - Breeding Birds Monitoring - Definition Summary	
Testable Hypothesis	NA - Compliance monitoring
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Daily during May – July of construction season
Sampling Locations	Reconnaissance around areas of existing natural vegetation cover
Sampling Timing	Early morning
Data Collection Methods	Use audio and visual cues to determine bird presence and activity pattern
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	Consult bird biologist to survey bird presence and activity pattern
Triggering Levels	Any presence of breeding or nesting pairs

Program 3.0 - Blasting

Table 3a - Summary Description of Blasting Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Wildlife, including freshwater and marine biota/Physical and behavioural effects
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Blasting noise/vibration
Key Project Interactions	Potential disturbance to wildlife; startle reaction to blasting events
Questions for Hypothesis Formation or Monitoring Goal	Does blasting disturb land and/or aquatic animals occurring proximate to the blast site?
Objective	Identify presence of any larger wildlife in order to prevent disturbance
Threshold	Exceedance threshold - presence of one large animal (bear, moose, caribou)
Scope of Monitoring Work	Conduct a walking survey of the perimeter of the project area (Grieg NL property boundary) prior to all scheduled blasts
Agency/Partner Participation	Wildlife Division; ECCC-CWS; DFO

Table 3b - Blasting Monitoring - Definition Summary	
Testable Hypothesis	NA - Compliance monitoring
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Intermittent; only when a blast is scheduled to occur
Sampling Locations	Property perimeter; proximate freshwater and marine areas
Sampling Timing	Prior to every scheduled blast
Data Collection Methods	Visual sighting, with binoculars as appropriate
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	NA
Data Interpretation and Reporting	Provide written record (fill out observation form) of each scan
Triggering Levels	TBD

Appendix B-2
RAS Hatchery – Operations Monitoring

4.0 – Hatchery Water Quality

5.0 – Hatchery Fish Health

6.0 – Hatchery Accidental/Unplanned Events

6.1 Escape

6.2 Spill

Program 4.0 - Hatchery Water Quality

Table 4a - Summary Description of Hatchery Water Quality Monitoring	
VEC	NA
Monitoring Target/Indicator	Hatchery water/Various water quality parameters
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Water temperature, conductance/TDS, pH, DO, metals, ions, etc.
Key Project Interactions	Input/makeup water quality versus hatchery specifications; treatment and monitoring requirements.
Questions for Hypothesis Formation or Monitoring Goal	Is the water source capable of providing the necessary quantity and quality of hatchery water? Can process water be treated as necessary to meet operating requirements for fish rearing?
Objective	Ensure water quality that meets standards.
Threshold	TBD
Scope of Monitoring Work	Confined to hatchery site.
Agency/Partner Participation	DMAE - Water Resources

Table 4b - Hatchery Water Quality Monitoring - Definition Summary	
Testable Hypothesis	NA - Compliance monitoring
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Daily during hatchery operations
Sampling Locations	TBD, to include each rearing facility
Sampling Timing	Continuous during hatchery operations
Data Collection Methods	<i>In situ</i> instrumentation; sample collection as per protocols
QA/QC Sampling Requirements	Offsite certified laboratory – percentage, parameters TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	Regulatory standards; internal standards for fish holding, rearing

Program 5.0 - Hatchery Fish Health

Table 5a - Summary Description of Hatchery Fish Health Monitoring	
VEC	Fish and Fish Habitat; Wild Salmon
Monitoring Target/Indicator	Farm fish/Various fish health parameters
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Survival (mortality) rate from fry to release to sea cages.
	Disease occurrences (morbidity) during hatchery retention period.
	Food conversion rate by growth stage.
Key Project Interactions	Environmental factors affecting fish health and growth.
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Determine the performance of European-strain triploids at all stages of their development.
Threshold	TBD
Scope of Monitoring Work	Document mortalities. Document growth rates and feed conversion rates. Monitor health condition (behavior observations, diagnostic testing) to ensure early disease detection at all growth stages. Conduct parasite screening.
Agency/Partner Participation	DFO, DFLR

Table 5b - Hatchery Fish Health Monitoring - Definition Summary	
Testable Hypothesis	NA - Compliance monitoring
Sample Size Requirements (Levels of Replication)	TBD, by topic
Sampling Frequency	TBD, by topic
Sampling Locations	Within RAS hHatchery property
Sampling Timing	TBD by topic
Data Collection Methods	TBD by topic
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	NA

Program 6.1 – Hatchery Fish Escape

Table 6.1a – Summary Description of Fish Escapement Monitoring *	
VEC	Fish and Fish Habitat; Wild Salmon
Monitoring Target/Indicator	Wild Placentia Bay salmon
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	DNA profile (genetic integrity) of spawning salmon in adjacent rivers
Key Project Interactions	Escaped salmon (during transfer from Hatchery to the wellboat) joining the run of wild salmon to natal rivers for spawning. Interference with wild salmon spawning; breeding between wild and farmed (triploid) salmon
Questions for Hypothesis Formation or Monitoring Goal	Has the occurrence of escaped triploid farmed salmon in Placentia Bay compromised the genetic integrity of wild salmon populations?
Objective	Using background DNA profiles of Placentia Bay wild salmon provided by DFO and farmed salmon provided by Grieg NL, confirm the potential for wild-farmed salmon interbreeding.
Threshold	NA
Scope of Monitoring Work	Focus on selected salmon rivers proximate to land-based facility. Capture and collect a blood sample from adults present in each river. Focus on avoiding any harm to sampled salmon.
Agency/Partner Participation	DFLR, DFO, Community Conservation Groups, Others?
* See also Program 18.1	

Table 6.1b – Wild Salmon Monitoring - Definition Summary	
Testable Hypothesis	TBD
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Once following an escape incident.
Sampling Locations	One or two rivers proximate to the escape site.
Sampling Timing	September- October following the escape incident.
Data Collection Methods	Non-lethal capture of fish, with monitoring for recovery from handling.
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	Escapement size (number of fish) as per DFO regulations

Program 6.2 – Hatchery Spills

Table 6.2a – Summary Description of Spill Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Spill impact zone
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Define areal extent of spill, and of recovery efforts
Key Project Interactions	Spills can involve pollutants (e.g. hydrocarbons) that can result in a deleterious effect on the receiving environment.
Questions for Hypothesis Formation or Monitoring Goal	How large is the zone of impact from the event? How successful have been containment and recovery operations?
Objective	As part of an Emergency Response, conduct monitoring to delineate the impact zone and the success of recovery and rehabilitation efforts.
Threshold	NA
Scope of Monitoring Work	Apply only to spills of hazardous or deleterious materials. Develop as part of Emergency Preparedness and apply only in the event of a spill event.
Agency/Partner Participation	Spill Response Organization

Table 6.2b – Spill Monitoring - Definition Summary	
Testable Hypothesis	TBD
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Initiate following a spill incident; establish frequency based on the area affected, the dynamics of dispersal mechanisms and the success of containment and recovery efforts
Sampling Locations	Proximate to and down-gradient from the spill site
Sampling Timing	TBD
Data Collection Methods	Visual; field collection and testing depending on nature of spilled material.
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	Reportable spill of hazardous/contaminant material

Appendix B-3

RAS Hatchery – Decommissioning

7.0 – Hatchery Decommissioning

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Insert tables for hatchery decommissioning

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Appendix B-4
Marine – Construction and Operations Monitoring

8.0 – MetOcean

8.1 Water Column

8.2 Climate and Meteorology

8.3 Ice

9.0 – Sea Cage Performance

10.0 – Benthic Habitat

11.0 – Marine Ecosystem

12.0 – Wild Salmon

13.0 – Bird Entanglement

14.0 – Marine Mammals and Sea Turtles

15.0 – Species at Risk

16.0 – Seawater Quality

17.0 – Fish Health (At-sea)

18.0 – Accidental/Unplanned Events

18.1 Escape

18.2 Spill

18.3 Therapeutants and Antibiotics

19.0 – Decommissioning

20.0 – Cumulative Effects

Program 8.1 – MetOcean: Water Column

Table 8.1a – Summary Description of MetOcean Water Column Monitoring	
VEC	Fish and Fish Habitat; Wild Salmon
Monitoring Target/Indicator	Physical oceanography-water column characteristics
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Water currents-speed and direction; temperature; conductivity (salinity) pH; TDS; DO; surface wave characterization.
Key Project Interactions	The maritime physical environment will impose stresses on sea cages and moorings, and can impose limitations on some operational activities (feeding, maintenance, fish transfers) and, in an extreme event cause damage to equipment that resulted in fish escapes.
Questions for Hypothesis Formation or Monitoring Goal	Are physical oceanographic conditions beyond the design parameters for the sea cage system? Is there evidence of concurrent phenomena whose combined forces exceed design criteria?
Objective	Quantify the forces imposed by the physical environment, especially where they approach or exceed design criteria. Assemble data to improve prediction and modeling capabilities.
Threshold	TBD
Scope of Monitoring Work	Confined to sea cage (BMA) sites
Agency/Partner Participation	TBD

Table 8.1b – MetOcean Water Column Monitoring - Definition Summary	
Testable Hypothesis/Goal of Monitoring	Measured forces that could exceed design criteria for sea cage operations
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Oceanography – ADCP set for sampling frequency; deployed year-round at active BMAs
Sampling Locations	ADCP deployment as per baseline deployments
Sampling Timing	See technical requirements for standard oceanographic sampling/data logging. Mid-summer? (see protocol)
Data Collection Methods	Visual data (sea state observations) as per CMA forms and standards; digital data as per standards
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	NA

Program 8.2 – MetOcean: Meteorology

Table 8.2a – Summary Description of MetOcean Meteorology Monitoring	
VEC	Fish and Fish Habitat; Wild Salmon
Monitoring Target/Indicator	Climate and weather conditions-winds, temperature, precipitation
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Air temperature, wind speed and direction, barometric pressure, precipitation – type and rate
Key Project Interactions	The maritime physical environment will impose stresses on sea cages and moorings. These could serve to hamper normal operations (feeding, maintenance) and, in an extreme event cause damage to equipment that resulted in fish escapes
Questions for Hypothesis Formation or Monitoring Goal	Are physical conditions beyond the design parameters for the sea cage system? Is there evidence of concurrent phenomena that exceed design criteria?
Objective	Quantify the forces imposed by the physical environment, especially where they approach or exceed design criteria Assemble data to improve prediction and modeling capabilities
Threshold	TBD
Scope of Monitoring Work	Confined to sea cage (BMA) sites
Agency/Partner Participation	ECCC?

Table 8.2 b – MetOcean - Meteorology Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	As per Standard MetOcean protocols.
Sampling Frequency	Meteorology – continuous (sampling as per standard instrumentation and data logging equipment)
Sampling Locations	Meteorology to be ship-based using the feed vessels
Sampling Timing	See technical requirements for standard met sampling/data logging Year round (see protocol)
Data Collection Methods	Visual data (sea state observations) as per CMA forms and standards; digital data as per standards
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	NA

Program 8.3 – MetOcean: Ice

Table 8.3a – Summary Description of MetOcean- Ice Monitoring	
VEC	Fish and Fish Habitat; Wild Salmon
Monitoring Target/Indicator	Ice - ??
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Ice accretion thickness; pack ice concentration, thickness; iceberg presence (location, size and movement pattern)
Key Project Interactions	Ice has the potential to interfere with normal operations (ice accretion) and presents the possibility of rendering damage to sea cages and moorings. The presence of pack ice and icebergs could serve to hamper normal operations (feeding, maintenance) and, in an extreme event, cause damage to equipment that could result in fish escapes
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Quantify the presence, rate and direction of movement of ice in proximity to BMAs
Threshold	NA
Scope of Monitoring Work	Ongoing throughout Operations period
Agency/Partner Participation	Transport Canada

Table 8.3b – MetOcean – Ice Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Ice accretion – continuously throughout winter (sub-zero air temperature) conditions Pack ice – continuously during March – May (?) Icebergs (as per external reporting)
Sampling Locations	Ice accretion – at each BMA work site Pack ice – ship-based
Sampling Timing	Ice accretion – continuous when operable Pack ice – hourly, adjusted with proximity
Data Collection Methods	Ice accretion - Visual Observation Pack ice, icebergs – visual observation; external data sources; Use Ice Central forms.
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	NA

Program 9.0 - Sea Cage Performance

Table 9a – Summary Description of Sea Cage Performance Monitoring	
VEC	Fish and Fish Habitat; Wild Salmon
Monitoring Target/Indicator	Moorings Floating Collars Bottom Ring/Sinker Ring Net Winch System
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Design specifications -limitations
Key Project Interactions	The forces interacting with the sea cage systems as a result of natural conditions at each BMA location.
Questions for Hypothesis Formation or Monitoring Goal	Are Aqualine Midgard sea cage systems capable of withstanding physical forces imposed by Placentia Bay conditions (wind, waves, currents, ice accretion)?
Objective	Quantify the performance of sea cages in response to conditions in Placentia Bay.
Threshold	Stated design maxima/ performance limitations.
Scope of Monitoring Work	Ongoing throughout Operations period.
Agency/Partner Participation	DFLR, DFO

Table 9b – Sea Cage Performance Monitoring - Definition Summary	
Goal	Monitor Aqualine Midgard sea cage performance
Sample Size Requirements (Levels of Replication)	See attachment 1
Sampling Frequency	See attachment 1
Sampling Locations	See attachment 1
Sampling Timing	See attachment 1
Data Collection Methods	Stress gauges, where appropriate Visual Observation (see attachment 1)
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	NA

Appendix B4 A
Aqualine Midgard System
Maintenance and Inspection Protocol

(insert file from Grieg NL)

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Program 10.0 - Benthic Habitat

Table 10a - Summary Description of Benthic Habitat Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Benthic habitat/Biochemical characteristics
Monitoring Category	EEM
Design Type	Control-Exposure
Measurable Parameter and Endpoints	Epibenthic species density; habitat characterization; sediment grain size; oxygen content; free sulfide content
Key Project Interactions	Organic deposition from sea cages altering the seabed environment within the depositional shadow of each structure
Questions for Hypothesis Formation or Monitoring Goal	Has habitat alteration occurred as a result of deposition? Has the affected benthic environment recovered to achieve the same level of productivity as existed in the baseline condition? What is the zone within which measurable habitat alteration has occurred?
Objective	Quantify the changes in benthic habitat caused by the operation of sea cages, especially with respect to benthic productivity
Threshold	See regulated standards for oxygen, free sulfide; establish standards for natural variability (habitat features, epibenthic fauna, sediment grain size)
Scope of Monitoring Work	As prescribed in Aquaculture Activities Regulations
Agency/Partner Participation	DFO, DFLR

Table 10b – Benthic Habitat Monitoring - Definition Summary	
Testable Hypothesis	TBD
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Baseline – minimum of one season of sampling; Operational – once per production cycle
Sampling Locations	For each BMA – select a suitable reference site; exposure locations as per protocol.
Sampling Timing	As per AAR – 30 days prior to or after the predicted maximum daily quantity of feed usage
Data Collection Methods	As per regulations outlined in AAR
QA/QC Sampling Requirements	Field duplicates; 10 % QA/QC samples
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	TBD

Appendix B-2A
Benthic Habitat Monitoring
DFLR Protocol

(Insert here)

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Program 11.0 – Marine Ecosystem

Commented [JC2]: This program requires considerable discussion, thus the vagueness at this point

Table 11a – Summary Description of Marine Ecosystem Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	TBD, but will be selected from water column interactions (vs benthic).
Monitoring Category	EEM – Research
Design Type	TBD
Measurable Parameter and Endpoints	Epibenthic species density; habitat characterization; sediment grain size; oxygen content; free sulfide content
Key Project Interactions	Parasite and disease vector transfer within the water column, possibly mediated by biofouling community
Questions for Hypothesis Formation or Monitoring Goal	Are there links between sea cage salmon and aquatic biota present in the water column? Is there any accumulation of pollutants or disease vectors in biofouling species which can act as a pathway to open water receptors?
Objective	
Threshold	TBD
Scope of Monitoring Work	To be established through review of interactions and development of research needs.
Agency/Partner Participation	DFO, DFLR

Table 11b – Marine Ecosystem Monitoring – Definition Summary	
Testable Hypothesis	TBD
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	TBD
Sampling Locations	TBD
Sampling Timing	TBD
Data Collection Methods	TBD
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	TBD

Program 12.0 - Wild Salmon

Table 12a – Summary Description of Wild Salmon Monitoring	
VEC	Wild Salmon
Monitoring Target/Indicator	Wild Placentia Bay salmon
Monitoring Category	Research
Design Type	TBD
Measurable Parameter and Endpoints	Size of adult salmon run to selected rivers Baseline DNA profile (genetic integrity) of wild salmon from known rivers to be provided by DFO
Key Project Interactions	Migrating salmon interacting with sea cages exposing individuals to increased parasite burden and disease vector transfer. Unplanned events (farmed fish escapes) leading to breeding between wild and farmed salmon
Questions for Hypothesis Formation or Monitoring Goal	What is the current level of genetic integrity of wild salmon in Placentia Bay? Has the presence of farmed salmon in Placentia Bay compromised the genetic integrity of wild salmon populations?
Objective	Monitor any measurable interaction between wild salmon and farm salmon
Threshold	NA
Scope of Monitoring Work	Focus on selected salmon rivers proximate to active BMA. Install and operate two counting fences for the duration of the smolt and adult runs.
Agency/Partner Participation	DFO, Community Conservation Groups, Others?

Table 12b – Wild Salmon Monitoring - Definition Summary	
Testable Hypothesis	NA – research only.
Sample Size Requirements (Levels of Replication)	Two fence installations
Sampling Frequency	Daily monitoring and counting of migrating fish.
Sampling Locations	Fence locations to be selected based on field conditions.
Sampling Timing	From fence installation (late May or when Spring runoff permits access; to late September)
Data Collection Methods	Conventional trap operation.
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	NA

Program 13.0 - Bird Entanglement

Table 13a – Summary Description of Bird Entanglement Monitoring	
VEC	
Monitoring Target/Indicator	Birds
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	NA
Key Project Interactions	Predation on at-sea caged fish by birds – potential fish mortalities; potential injuries and mortalities of birds
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Avoid any injury of birds through entanglements
Threshold	Early warning indicator – presence of birds
Scope of Monitoring Work / Approach	Surveillance level monitoring of bird presence during at-sea cage rearing. An ongoing surveillance carried out at each BMA throughout the period when sea cages are occupied with fish
Agency/Partner Participation	TBD

Table 13b Bird Entanglement Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Daily during Operations at active sites
Sampling Locations	Active sea cage sites
Sampling Timing	Early morning
Data Collection Methods	Use audio and visual cues to determine bird presence and activity pattern
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	Consult bird biologist to confirm bird presence and activity pattern
Triggering Levels	Presence of birds most likely to interact with sea cages

Program 14.0 - Marine Mammals and Sea Turtles

Table 14a – Summary Description of Marine Mammal and Sea Turtle Monitoring	
VEC	
Monitoring Target/Indicator	Marine mammals; large fish; turtles
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	NA
Key Project Interactions	Entanglements and breeches in sea cage netting by marine mammals and other large ocean dwelling organisms (sharks, turtles) with the potential to injure or kill animals, and allow for escape of at-sea aquaculture fish
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Avoid entanglements; avoid injury or escapes as a result of entanglements.
Threshold	Early warning indicator – presence of marine mammals or other large animals
Scope of Monitoring Work / Approach	Surveillance level monitoring of species presence during at-sea cage rearing. An ongoing surveillance carried out at each BMA throughout the period when sea cages are occupied with fish
Agency/Partner Participation	Whale Rescue Group; DFO, others (?)

Table 14b – Marine Mammal and Sea Turtle Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Daily during period of occupancy of fish in sea cages.
Sampling Locations	BMA with occupied sea cages.
Sampling Timing	NA
Data Collection Methods	When observed use video surveillance to document animal presence and activity
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	Consult marine mammal specialists to confirm risk level and activity pattern
Triggering Levels	Presence of marine mammals, sea turtles and large fishes with potential to entangle in nets.

Program 15.0 - Species at Risk

Table 15a – Summary Description of Species at Risk Monitoring	
VEC	Species at Risk
Monitoring Target/Indicator	Species at Risk
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	NA
Key Project Interactions	Any potential for habitat displacement, injury or mortality to species considered at risk. Potential interactions include marine transport and sea cage site operations
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Avoid any injury or disturbance to species at risk.
Threshold	Early warning indicator – presence of suspect species.
Scope of Monitoring Work / Approach	Surveillance level monitoring of marine mammal and sea turtle presence during at-sea cage rearing and while traveling An ongoing surveillance carried out at each BMA throughout the period when sea cages are occupied with fish Take cautionary and avoidance measures as appropriate.
Agency/Partner Participation	TBD

Table 15b - Species at Risk Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Daily during at sea activities.
Sampling Locations	All operating areas at sea.
Sampling Timing	Concurrent with marine operations activities.
Data Collection Methods	Use auditory and visual cues to determine individual presence and activity pattern. Maintain written record of all sightings and any incidents.
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	Consult resource managers to confirm animal presence and activity pattern
Triggering Levels	Presence of a species considered at risk in the proximity of sea cages

Program 16.0 – Seawater Quality

Table 16a – Summary Description of At Seawater Quality Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Various water quality parameters
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Water temperature, salinity conductivity, pH, DO, ions, TDS, TSS, plankton
Key Project Interactions	Ambient water quality is key to health of at-sea fish; water quality alterations as a consequence of sea cage operation is a source of potential environmental perturbation
Questions for Hypothesis Formation or Monitoring Goal	Is the ambient water of the quality required to ensure fish health and growth? Is the presence of sea cages and farmed fish resulting in a compromise of ambient water quality?
Objective	Ensure that ambient water quality meets sea cage rearing requirements; ensure that water quality impairment does not occur as a consequence of sea cage rearing operations
Threshold	TBD
Scope of Monitoring Work	Confined to sea cage rearing sites.
Agency/Partner Participation	DFO

Table 16b – Seawater Quality Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Daily to weekly depending on measured parameter; ongoing during at sea rearing operations
Sampling Locations	TBD, to include each active BMA.
Sampling Timing	Up to daily, depending on parameter
Data Collection Methods	<i>In situ</i> instrumentation; sample collection as per protocols
QA/QC Sampling Requirements	Offsite certified laboratory – percentage, parameters TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	Regulatory standards; internal standards for fish sea cage rearing

Program 17.0 - At-Sea Fish Health

Table 17a – Summary Description of At-Sea Fish Health Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Farmed Fish
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Survival (mortality) rate during rearing at sea
	Disease occurrences (morbidity) during at-sea period
	Food conversion rate
Key Project Interactions	Environmental factors (physical, biological, toxicological) affecting fish health and growth.
Questions for Hypothesis Formation or Monitoring Goal	NA
Objective	Determine the performance of European-strain triploids at all stages of their development based on industry norm and expectation
Threshold	TBD
Scope of Monitoring Work	Confirm effectiveness of biosecurity measures; document mortalities. Document growth rates and feed conversion rates. Monitor health condition (behavior observations, diagnostic testing) to ensure early disease detection. Conduct parasite screening. Employ video monitoring of feeding rates, and for site security.
Agency/Partner Participation	DFO, DFLR

Table 17b – At-Sea Fish Health Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	TBD, by topic
Sampling Frequency	TBD, by topic
Sampling Locations	At each BMA
Sampling Timing	TBD
Data Collection Methods	TBD
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	NA

Program 18.1 – Accidental/Unplanned Events – Sea Cage Fish Escape

Table 18.1a – Summary Description of Sea Cage Fish Escape Monitoring*	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Wild Placentia Bay salmon
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	DNA profile (genetic integrity) of spawning salmon in adjacent rivers
Key Project Interactions	Escaped salmon joining the run of wild salmon to natal rivers for spawning. Interference with wild salmon spawning; breeding between wild and farmed (triploid) salmon
Questions for Hypothesis Formation or Monitoring Goal	Has the occurrence of escaped triploid farmed salmon in Placentia Bay compromised the genetic integrity or spawning success of wild salmon populations?
Objective	Using background DNA profiles of Placentia Bay wild salmon provided by DFO and farmed salmon, confirm the potential for wild-farmed salmon interbreeding.
Threshold	NA
Scope of Monitoring Work	Focus on selected salmon rivers proximate to active BMA. Capture and collect a blood sample from adults present in each river. Focus on avoiding any harm to sampled salmon.
Agency/Partner Participation	DFLR, DFO, Community Conservation Groups, Others?
* See also Program 6	

Table 18.1b – Sea Cage Fish Escape Monitoring - Definition Summary	
Testable Hypothesis	TBD
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Once following an escape incident.
Sampling Locations	One or two rivers proximate to the escape site.
Sampling Timing	September- October following the escape incident.
Data Collection Methods	Non-lethal capture of fish, with monitoring for recovery from handling.
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	Escapement size (number of fish) as per DFO regulations

Program 18.2 – Marine Spills

Table 18.2a – Summary Description of Marine Spill Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Spill impact zone
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Define areal extent of spill, and of recovery efforts
Key Project Interactions	Spills can involve pollutants (e.g. hydrocarbons) that can result in a deleterious effect on the receiving environment.
Questions for Hypothesis Formation or Monitoring Goal	How large is the zone of impact from the event? How successful have been containment and recovery operations?
Objective	As part of an Emergency Response, conduct monitoring to delineate the impact zone and the success of recovery and rehabilitation efforts.
Threshold	NA
Scope of Monitoring Work	Apply only to spills of hazardous or deleterious materials. Develop as part of Emergency Preparedness and apply only in the event of a spill event.
Agency/Partner Participation	Spill Response Organization

Table 18.2b – Marine Spill Monitoring - Definition Summary	
Testable Hypothesis	TBD
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Initiate following a spill incident; establish frequency based on the area affected, the dynamics of dispersal mechanisms and the success of containment and recovery efforts
Sampling Locations	Proximate to and down-gradient (at different distances from source) from the spill site
Sampling Timing	TBD
Data Collection Methods	Visual; field collection and testing depending on nature of spilled material.
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	Reportable spill of hazardous/contaminant material

Program 18.3 – At-sea Use of Therapeutants or Antibiotics

Table 18.3a – Summary Description of Therapeutants or Antibiotic Monitoring	
VEC	Fish and Fish Habitat
Monitoring Target/Indicator	Food chain links available for uptake of subject substances.
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Chemical constituents of therapeutants or antibiotics
Key Project Interactions	As a contingency, therapeutants and/or antibiotics may need to be administered to at-sea salmon. Residual traces of medications could enter the surrounding environment and become bioavailable.
Questions for Hypothesis Formation or Monitoring Goal	Has the at sea application of therapeutants or antibiotics resulted in their uptake and bioaccumulation in the surrounding marine environment?
Objective	Determine the presence and persistence of therapeutants and antibiotic in the surrounding marine environment food web
Threshold	NA
Scope of Monitoring Work	Focus on benthic accumulation and potential uptake by infauna.
Agency/Partner Participation	DFLR, DFO, Others?

Table 18.3b – Therapeutants or Antibiotic Monitoring - Definition Summary	
Testable Hypothesis	TBD
Sample Size Requirements (Levels of Replication)	TBD
Sampling Frequency	Once following administration of therapeutants or antibiotics
Sampling Locations	Seabed below sea cage sites
Sampling Timing	Initial sampling within two weeks of commencement of administering subject substances
Data Collection Methods	Conventional grab for collection of sediment and benthic organisms
QA/QC Sampling Requirements	TBD
Sample Handling and Analysis	TBD
Data Interpretation and Reporting	TBD
Triggering Levels	Scale of treatment – quantities and duration.

Program 19.0 – Decommissioning

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Program 20.0 – Cumulative Effects

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Appendix B

Appendix B-5 Socio-Economic Issues

21.1 Training

21.2 Equity and Local Benefits

21.3 Resource Users

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Appendix B

Program 21.1 - Training

Table 21.1a – Summary Description of Training Monitoring	
VEC	Training and Employment
Monitoring Target/Indicator	Residents of Placentia Bay
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Post-secondary training and qualification
Key Project Interactions	Recruitment and retention of suitable qualified employees and contractors. Provision of employment income to the Placentia Bay region.
Questions for Hypothesis Formation (Goal)	NA
Objective	Optimize employment opportunities for residents of Placentia Bay.
Threshold	NA
Scope of Monitoring Work	Maintain a record of training supplied by local institutions and match against project requirements; maintain a record of recruits and training level achieved upon first hire, and throughout their employment period; maintain a listing by training subject of employment candidates.
Agency/Partner Participation	Regional training institutions

Table 21.1 b – Training Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Annually, geared to program durations
Sampling Locations	Local training entities; in-house personnel records.
Sampling Timing	NA
Data Collection Methods	As appropriate and within confidentiality restrictions.
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	All raw data to be treated with confidence; aggregated data to be available publicly.
Data Interpretation and Reporting	Analyze results in terms of anticipated project personnel requirements
Triggering Levels	NA

Appendix B

Program 21.2 - Equity and Local Benefits

Table 21.2a – Summary Description of Equity and Local Benefits Monitoring	
VEC	Economy?
Monitoring Target/Indicator	Employees of Grieg NL and contractors
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Employee – gender, age, cultural background, ethnicity
Key Project Interactions	Recruitment and retention of suitable qualified employees and contractors based on gender equity and diversity that reflects the surrounding region
Questions for Hypothesis Formation (Goal)	NA
Objective	Optimize employment opportunities for all residents of Placentia Bay, regardless of gender, age, cultural background and ethnicity
Threshold	NA
Scope of Monitoring Work	Maintain a record of hires according to self-declared gender, age category and ethnicity. Maintain a listing by subject areas of direct and contractor hires during both Construction and early Operations periods
Agency/Partner Participation	Women's Policy Office

Table 21.2 b – Equity and Local Benefits Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	On-going throughout employee recruitment period.
Sampling Locations	In-house personnel records.
Sampling Timing	From start of Construction until 3 years into Operations.
Data Collection Methods	As appropriate and within confidentiality restrictions. All information will be based on self-declaration and provided voluntarily.
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	All raw data to be treated with confidence; aggregated data to be available to the public
Data Interpretation and Reporting	Analyze results in terms of established targets, and to reflect changes (improvement) over time
Triggering Levels	NA

Appendix B

Program 21.3 - Resource Users

Table 21.3a – Summary Description of Resource User Monitoring	
VEC	??
Monitoring Target/Indicator	Marine resource use/Non-Project users
Monitoring Category	Surveillance
Design Type	Compliance
Measurable Parameter and Endpoints	Non-Project traffic within active BMAs
Key Project Interactions	Presence of Project features (sea cages, vessels and vessel traffic) and other boat traffic and marine activities.
Questions for Hypothesis Formation (Goal)	NA
Objective	Minimize traffic disruption by the presence of the Project.
Threshold	Acceptable alteration of speed or course by non-Project traffic in the area of Project operations.
Scope of Monitoring Work	Maintain a written record of all non-project traffic observed within a BMA, noting vessel type if possible.
Agency/Partner Participation	Transport Canada, CCG, community organizations, resource harvester groups. (?)

Table 21.3b – Resource User Monitoring - Definition Summary	
Testable Hypothesis	NA
Sample Size Requirements (Levels of Replication)	NA
Sampling Frequency	Ongoing during marine activities.
Sampling Locations	Active BMA sites, transit routes.
Sampling Timing	As occurrences are detected.
Data Collection Methods	Visual sighting, with binoculars and vessel radar as appropriate
QA/QC Sampling Requirements	NA
Sample Handling and Analysis	NA
Data Interpretation and Reporting	Provide written record (fill out observation form) of each encounter.
Triggering Levels	TBD